

Annual AVMA Meeting
Detroit, Michigan
August 20-24, 1961

Journal

OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION

A Phycomycosis of Horses

THIS REPORT describes 23 cases of localized granulomatous mycotic infections of horses and isolation of the etiologic agent. Page 579

"Repeat Breeding" in Dairy Cattle

AN EVALUATION of treatment of "repeat breeder" cattle by uterine infusion of antibiotics. Page 590

Dirofilaria immitis in Dogs

A STUDY of the effects of dithiazanine iodide on *Dirofilaria immitis* in sentry dogs. Page 605

Handling and Treatment of Exotic Pets

TECHNIQUES are given for restraint, anesthesia, treatment, and immunization of exotic wild pets. Page 608



Vol. 138

June 1, 1961

No. 11

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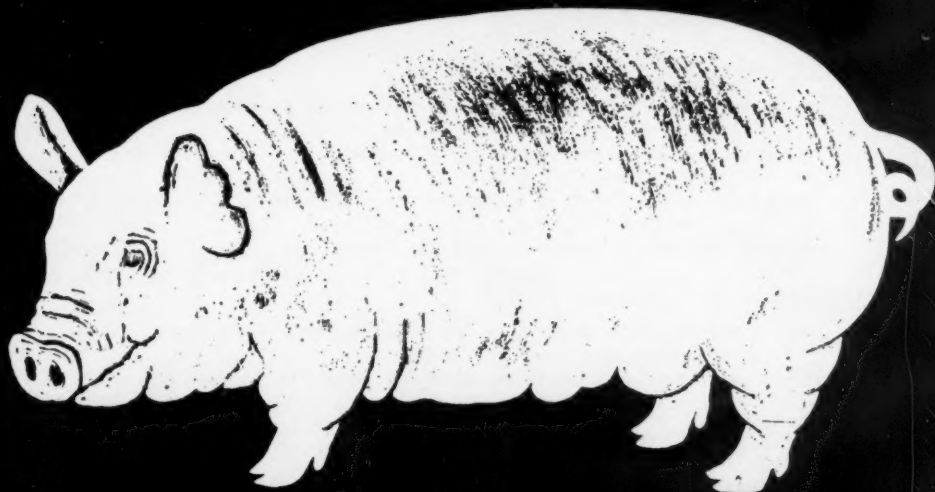
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Journal

OF THE
AMERICAN VETERINARY
MEDICAL ASSOCIATION

Vol. 138

No. 11

June 1, 1961

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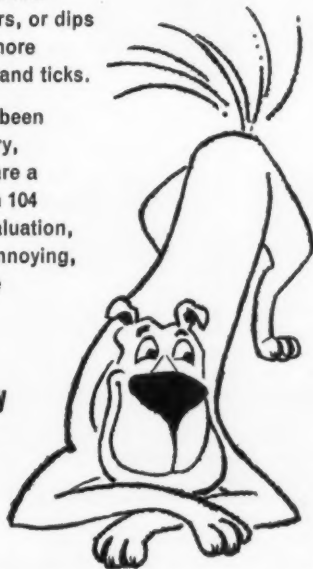
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Correspondence

***Pseudomonas* Contamination**

April 18, 1961

Dear Sir:

Re: "Transmission of Hepatitis Virus in Rabies Vaccine Disproved" (*J.A.V.M.A.*, March 15, 1961) in which you commented on "Infectious Canine Hepatitis Coincidentally Associated with Vaccination Against Rabies," O. A. Soave, *Am. J. Pub. Health*, 50: 1582-1587.

An important point made in this paper, which you did not mention, was the finding that the vaccine was heavily contaminated with *Pseudomonas* spp. To quote the author:

"Even if the *Pseudomonas* organism is relatively nonpathogenic for the dog as a primary incitant of disease, it may conceivably exert some adverse effect on the animal's resistance to infection with known pathogens. If the administration of a vaccine constitutes in itself a stress factor which may, in some degree, alter resistance to infection, then it would obviously seem desirable to keep specific vaccines free of contaminating microorganisms. Aside from the economic considerations, which are relatively minor, there appears to be no good reason why biologic products for veterinary use should not meet the same high standards applied to similar products employed in human medicine, at least insofar as freedom from contaminating microorganisms is concerned."

S/ROBERT J. FLYNN, V.M.D.
Argonne National Laboratory
9700 S. Cass Ave.
Argonne, Ill.

Veterinary Technologists

May 3, 1961

Dear Sir:

I should like to comment on the editorial, Veterinary Technologists, which appeared in the April 15, 1961, issue of the JOURNAL.

The College of Veterinary Medicine at Michigan State University since 1927 has administered a degree program in medical technology. It is a high quality program but, like our D.V.M. program, it has not in many years produced enough graduates to meet the demand. In short, we need twice as many medical technology students as we are getting, even though these young women are able to demand beginning salaries above \$5,000.

Our experience with this fine program leads me to the following conclusions:

1) It is unlikely that we could attract at this time enough students to make it economically feasible to develop and sustain a program in veterinary technology.

(Continued on adv. p. 6)

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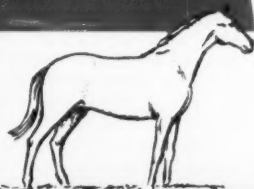
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Correspondence—continued from adv. p. 4.

2) It seems unlikely that there would be enough veterinarians able and willing to employ the graduates of such a program at salaries which would justify college-level training.

I think that well-trained veterinary technologists would be an asset to our profession and I would not be apprehensive about controlling their activities. But it is my own feeling that veterinary medicine has a lot of growing to do—both up and out—before it will be economically practical to undertake formal training of veterinary technologists.

s/W. W. ARMISTEAD, Dean
College of Veterinary Medicine
Michigan State University

April 17, 1961

Dear Sir:

I have just read your April 15 editorial concerning veterinary technologists. This subject has arisen at various times in my counselling of preveterinary students with respect to their future opportunities. There are students who, for various personal or scholastic reasons, find themselves unable to fulfill their primary goal of a career in veterinary medicine. They occasionally indicate that they would like to stay close to the veterinary field and have inquired about employment as veterinary technicians after a 4-year college course in zoology, animal or dairy husbandry, or other comparable training. Perhaps others would have indicated such interest had they thought that such opportunities might exist.

I have given this matter considerable thought over the past few years and your editorial most ably brings my thoughts together on the matter. As it stands, it would seem that the demand is rather limited and the offerings of salary too meager to attract capable men. Though I realize that our preveterinary students do not have the practical training which might be demanded of a veterinary technician, I have found it difficult to find veterinary practitioners who would agree to provide even a summer position for our "untrained" students though many of these men are the cream of the crop academically and could render a satisfactory service to the veterinarian in return for experience. This, I think, is an important aspect of our educational program which we have not been able to follow up—providing the neophyte with actual experience and insight into the work of the profession and thus either arouse his enthusiasm or provide him with a means of orientation through which he can decide for or against a career in the profession.

We should recall instances such as the interest in lay bleeders for the brucellosis program where nonprofessional personnel were to take on a veterinary function. In Pennsylvania, at least, the profession has taken a back seat on service to the poultryman because the feed companies with their field personnel have offered service which would not or could not be made available by most veterinarians. Similar instances must have occurred in other areas of the country.

Now the so-called "progressives" are promoting a program for training "quacks." I am certainly one of the many members of the profession who would dislike the label of nonprogressive or conservative, but I do think that those who advocate this program have not carefully analyzed all its possible implications. I hope your editorial will stimulate a renewal of these deliberations before rash decisions are made. This does not mean to infer that the idea is not without some merit. I merely suggest a cautious approach to the problem.

s/R. E. SWOPE, V.M.D.
Pennsylvania State University

April 20, 1961

Dear Sir:

I would like to take this opportunity to congratulate you on the fine editorial you had in the last issue of the AVMA JOURNAL in regard to the training of veterinary technologists. For Wisconsin members it came at a very opportune time as we are in the midst of trying to get a revision of our Veterinary Practice Act passed. I have been confronted with some complacency on behalf of some of our members. This article should do much to stimulate these men into action!!!

s/W. J. O'ROURKE, D.V.M.
Secretary, Wisconsin V.M.A.

April 24, 1961

Dear Sir:

The editorial in the April 15 issue of the JOURNAL of the AVMA regarding veterinary technologists is food for thought, but is difficult to digest.

The terms, veterinary technologist, medical technologist, veterinary assistant, and technician are used without distinction, and the duties to be performed by these people are not clearly stated. If the thought is to have these people function as medical technologists, it should be pointed out that there are highly trained personnel certified by the American Society of Clinical Pathologists who rightfully bear that title. They are required to complete 3 or 4 years of college and 1 year of supervised training in an approved laboratory. They are qualified to perform all types of clinical laboratory work, including that required by veterinarians. It seems unlikely that the veterinary profession should attempt to set up a duplicate educational and training program.

A technician or veterinary assistant, on the other hand, could mean a person trained to perform any technical or non-technical duty. In veterinary practice, this might be animal nursing, administration of medications, grooming, etc. If this is the type of person visualized in the editorial, then the name medical or veterinary technologist should not apply.

I think there is a real need for trained veterinary nurses in small animal practice and perhaps assistants to aid the large animal practitioner to perform such duties as vaccinating or medicating animals on a herd basis. A real mistake, however, would be to attempt to train a handyman to fulfill the duties of both a technologist and an assistant. Such a person, to do a qualified job, would require education and practical training equal to the veterinarian. It is not

likely that many people so trained would function in both capacities; it is less likely that they would function well in either capacity.

S/CHARLEY E. GILMORE, D.V.M.
Boston, Mass.

[Dr. Gilmore's concern is well taken. We favor well-defined terms; however, the terms appearing in the editorial were used advisedly, in the interest of objective reporting. Responsibility for assigning an official name to the people trained (highly or otherwise) to help veterinarians will rest mainly with the training institution or a certifying agency.—Ed.]

May 5, 1961

Dear Sir:

With reference to the editorial on veterinary technologists, there have been frequent requests for our college to start a program of this kind and you might be interested to know that we have a committee studying this very problem.

In order to find out whether there is a demand and need for this type of program, we are going to meet with the various veterinary groups in the state, devoting one whole evening in various cities to a discussion of the problem. We want to make sure that any action which we take will represent the

majority feeling of veterinarians in our state. Thus far we have only had one meeting and as could be expected the proponents were largely from the small animal practitioners' side of the profession while the opponents and those who were somewhat uncertain as to the need were largely confined to the large animal practitioners. I feel that the editorial in the April 15 issue stated the case very clearly and we have suggested that all veterinarians read this before coming to the meetings.

S/WALTER R. KRILL, Dean
School of Veterinary Medicine
Ohio State University, Columbus

[Our readers will be interested to know that the matter of training veterinary technologists is under consideration by 2 AVMA Councils, the Council on Veterinary Service and the Council on Education, scheduled to meet next in October and December, respectively.

Those who feel there is some value in watching the progress of the denturists may be interested to know that the first "public denturist" bill of 1961 was introduced in Oklahoma. The bill would establish "master dental technicians" who would be authorized to deal with the public in making impressions for and constructing full dentures.—Ed.]

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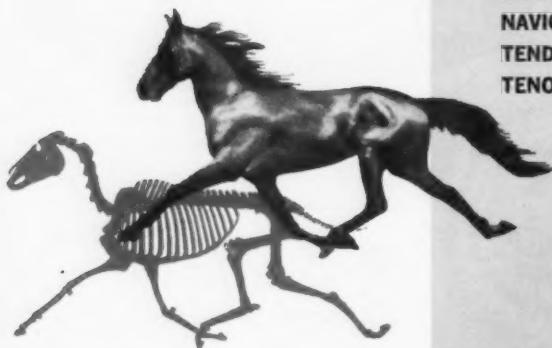
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FROM THE AVMA WASHINGTON OFFICE

J. A. McCallam, VMD
Brig. Gen. USA (Ret.)

LEGISLATION

Aeronautics and Space Act Amended

H.R. 6169, to amend section 201 of National Aeronautics and Space Act of 1958, became P.L. 87-26 when approved by the President on April 25. It establishes in the Executive Office the National Aeronautics and Space Council.

Social Security Benefits Increased

The House passed H.R. 6027, amendments to Title II of Social Security Act. Bill increases minimum benefits and aged widows' benefits, provides that men eligible may receive reduced benefits at age 62, and makes additional persons eligible under the program; also increases rate of self-employment tax and the rate on employer and employee under the Federal Insurance Contribution Act.

Hearings Begin on Health Education Aid

Subcommittee on Health, Senate Labor, and Public Welfare Committee commenced hearings on S. 1072, proposed Health Professions Educational Assistance Act of 1961 (see JOURNAL April 1, adv. p. 10) with HEW Secretary Ribicoff as lead-off witness. Latter urged approval of this Administration medical education bill to head off critical shortage of physicians and dentists. Hearings also scheduled for May 3 and 5. Senator Humphrey (D., Minn.) introduced an amendment to S. 1072 to include Schools of Pharmacy.

Committee Suggests NIH Grant Reforms

House Committee on Intergovernment Relations advocates some administrative reforms in report resulting from 2-year study of NIH medical research grants by its Subcommittee. Copy of this report, "The Administration of Grants and Awards by the National Institutes of Health," may be obtained free by writing to House Intergovernmental Relations Subcommittee, George Washington Inn, U.S. Capitol, Washington 25, D.C.

NEW BILLS

General Farm Bill

H.R. 6400—Rep. Cooley (D., N. Car.), and S. 1643, Sen. Ellender (D., La.)—the Administration general farm bill pertaining to farm prices and income, developing farm programs, adjusting supplies of agricultural commodities, improving distribution and expanding exports of agricultural commodities, liberalizing and extending farm credit services, protecting interest of consumers, etc.

(Continued on adv. page 12)



**"Names,
names,
names,
names . . .**

"Look at all the names they're giving to animal biologics—and different names for the same ones, too. The product field of veterinary medicine is becoming as confusing as that of human medicine, and, brother, that's the height of confusion. Ask your family doctor.

"Honestly, they're running wild with all those contrived names. My wife was thumbing through one of our journals the other day, and came across a vaccine with a name very similar to a kitchen disinfectant. Two

pages away was another biologic with a name almost the same as a high-speed developer I use in my basement darkroom.

"Did you ever wonder how they arrive at these pseudo-scientific labels? Just imagine the exhibition of sheer brilliance as a group of men sit around the conference table dreaming these up.

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Washington News—continued

Free Tariff for Horsemeat

S. 1718, Sen. Carlson (R., Kan.) and H.R. 6687, Rep. Avery (R., Kan.)—Identical bills to amend the Tariff Act of 1930 to place horsemeat on the free list.

Amend Trade Agreements

S. 1737, Sen. Burdick (D., N. Dak.)—To amend section 7(e) of Trade Agreements Extension Act of 1951 to include the livestock industry as a domestic industry producing products directly competitive with imported meat and meat products.


MISCELLANEOUS

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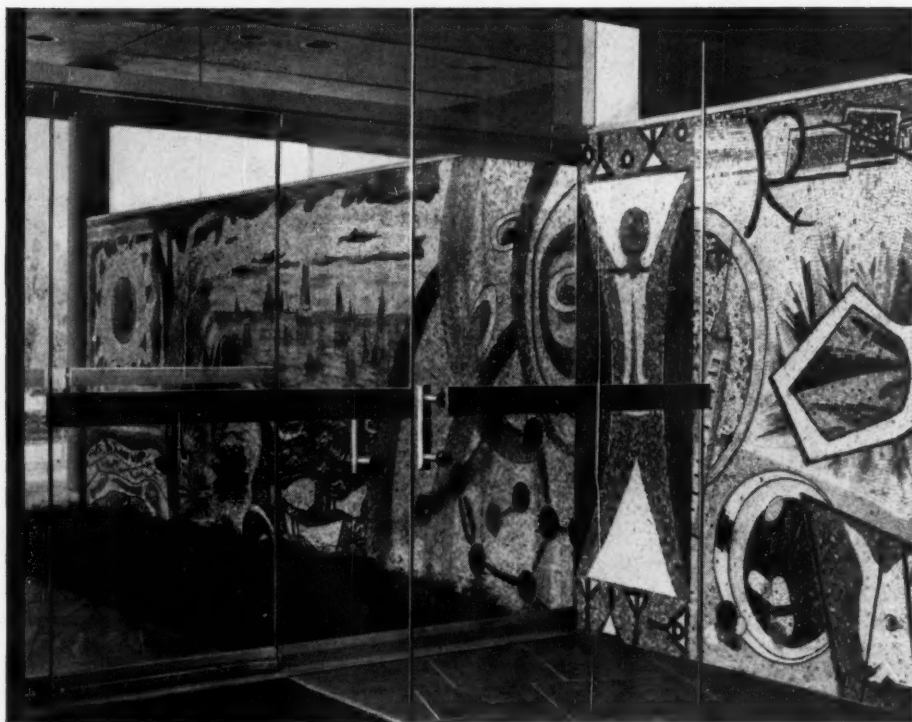
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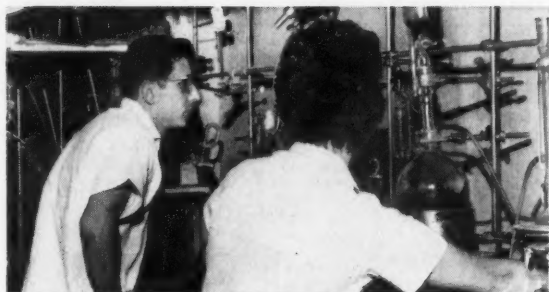
Thus, Groton is devoted to the search for new products and treatment methods for improving the well-being of man, *and* the animals he raises.



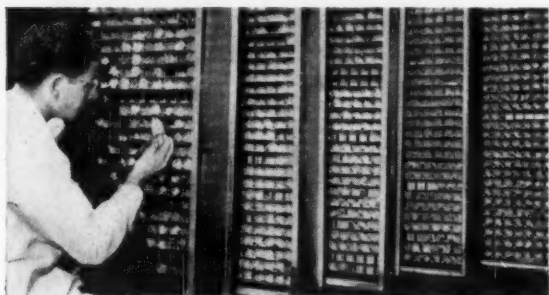
Researcher carefully handles apparatus to determine the melting point of a compound. This device is used in purity studies and is of basic importance to chemical and biochemical experiments.



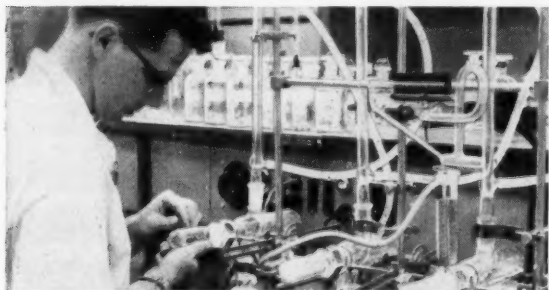
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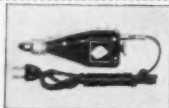
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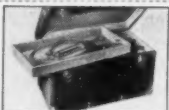
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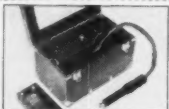
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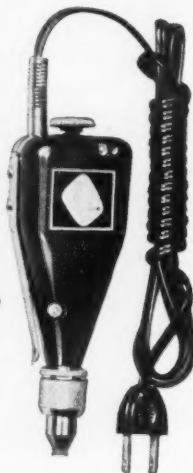


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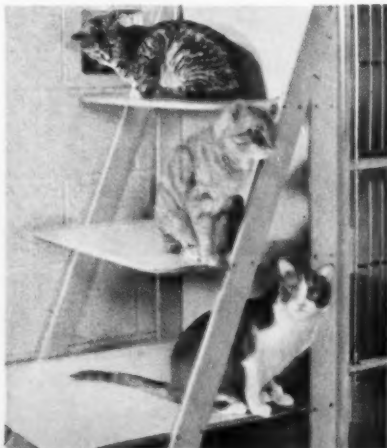
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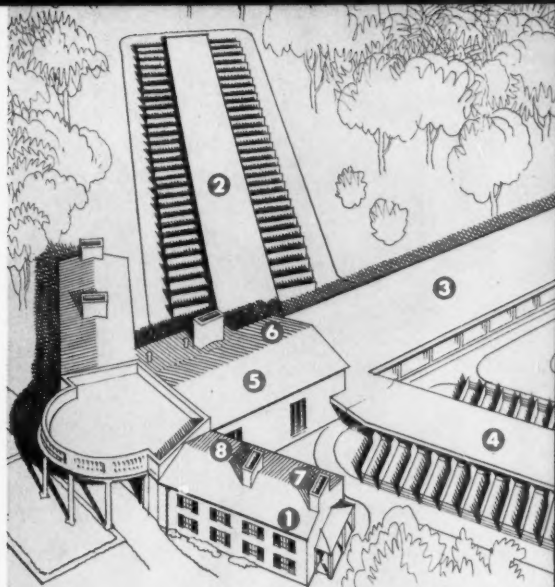
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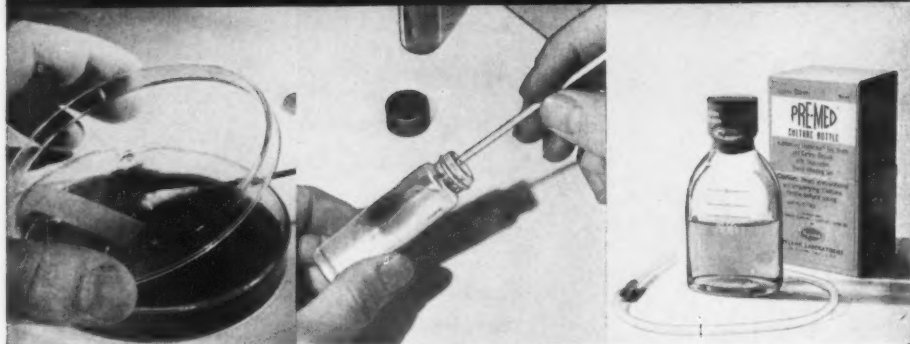


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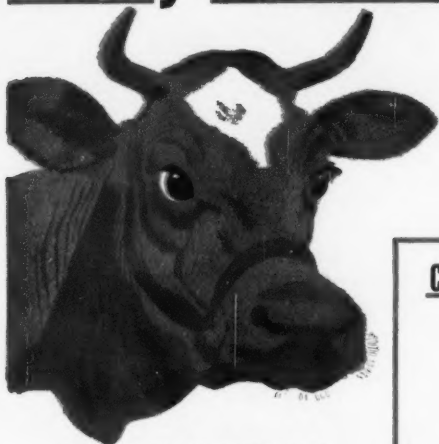
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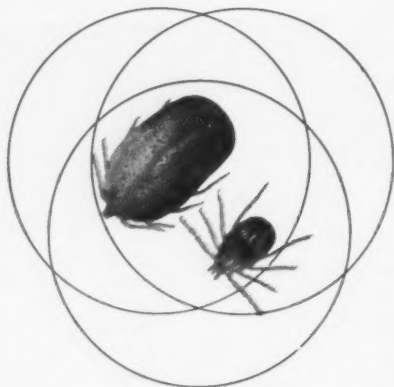
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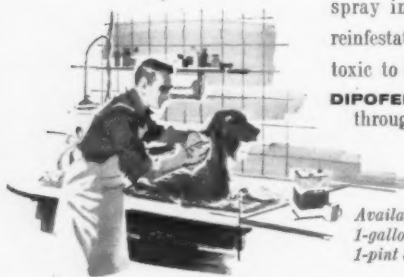


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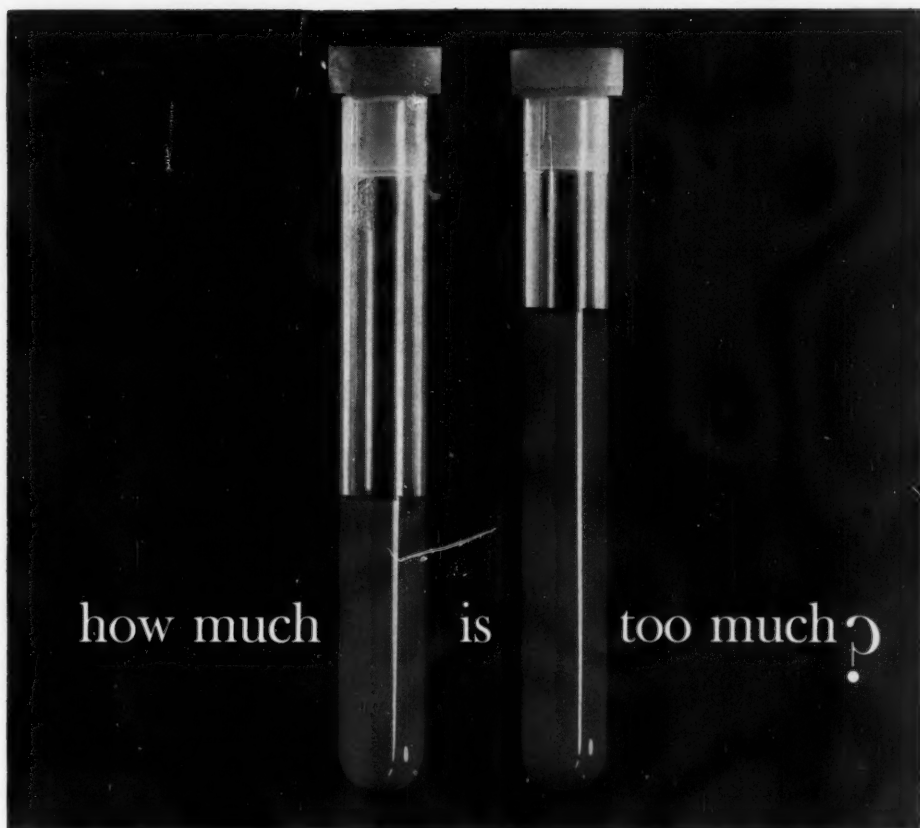
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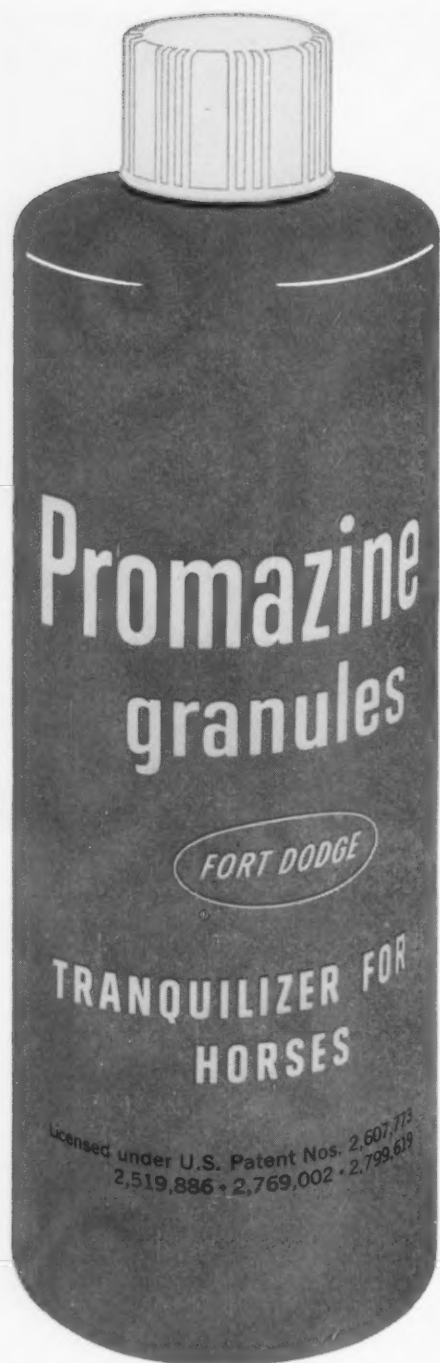
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AMERICAN VETERINARY
MEDICAL ASSOCIATION

A Phycomycosis of Horses Caused by *Hyphomyces destruens*

Charles H. Bridges, D.V.M., Ph.D., and Chester W. Emmons, Ph.D.

THIS REPORT describes 23 cases of localized granulomatous mycotic infections of horses and isolation of the etiologic agent, *Hyphomyces destruens*, from 8 of them. *Hyphomyces destruens* is described as it appeared in culture following initial isolation.

For many years similar pathologic lesions of the skin and mucous membranes have been described in several countries as "Florida horse leech,"^{1,6} "hyphomycosis destruens,"⁴ and "bursattee"³ (also spelled "bursattee" and "bursati"). There has been disagreement as to the etiologic agent or agents responsible for these lesions, which are characterized by the formation of foci of proliferative inflammation in the superficial tissues anywhere in the body but usually about the limbs, abdomen, neck, alae nasi, and lips.^{1,3,4,6} These lesions ulcerate and frequently grow large by peripheral extension and penetration of adjacent tissues. Within the granulation tissue are yellowish to gray masses of necrotic tissue, sometimes calcified, and fistulas with cores

of this yellowish to gray material which occasionally can be removed intact. These masses were called "leeches" in Florida^{1,6} and "kunkers" in India.³ The lesions may increase to such size that the animal must be euthanatized because of progressive disability.

An early investigator described a fungus which he saw in lesions of bursattee in India in 1884.⁷ His drawing depicted a mass of branching hyphae which he calculated to be about 1/1,000 inch wide (approximately 25 μ). He also claimed to have isolated the mold from the lesions.

In a report in 1903 of 8 cases of "hyphomycosis destruens" in Indonesia, the isolation of a fungus was described.⁴ The authors promised to identify the organism in another communication. Apparently this latter report was never made. In 1896, similar lesions on a horse treated at the veterinary school at Alfort, France, were described.⁵ A fungus which was isolated was not recognized as any known species. In 1925, a fungus which was isolated about 2 years earlier from the lesions of hyphomycosis destruens on a mare in Indonesia was identified as *Basidiobolus ranarum* Eidam.⁸ The author commented that it did not have any resemblance to the organism

Dr. Bridges is professor, Department of Veterinary Pathology, School of Veterinary Medicine, A. & M. College of Texas and Texas Agricultural Experiment Station, College Station; and Dr. Emmons is chief, Medical Mycology Section, Laboratory of Infectious Diseases, National Institute of Allergy and Infectious Diseases, National Institutes of Health, Bethesda, Md.



Fig. 1—Exuberant granulation tissue of hyphomycosis destruens equi surrounds the fetlock and extends to the hoof of a horse (case 1).

H. destruens which he had seen isolated from such lesions.

The *Annual Report of the Bureau of Animal Industry* for 1893-1894 briefly described a condition occurring in horses and mules in Florida and known locally as "leeches."¹ The author reported that the disease gave him the impression that it was not due to a "leech" but to a fungus, perhaps similar to those of actinomycosis and of Madura foot of India. The term "leeches" apparently originated from the belief of the people of Florida that the gray to yellow necrotic masses in the lesion were leeches (*Hirudinea*) which entered the skin while the horses and mules stood in water.

One worker studied lesions of bursattee as found in India and similar lesions from horses from Australia, Argentina, Greece, and Egypt.³ He found evidence of parasitic larvae in all the specimens which he stud-

ied and, from this, concluded that bursattee was the same as cutaneous habronemiasis. A report on leeches in horses of Florida stated that the author had never been able to associate parasites with the occurrence of this disease.⁶ It becomes apparent from this study that there has been disagreement as to the etiology of 2 unrelated diseases which were thought to be the same.

The following review of 23 cases of mycotic infections with the characteristics of hyphomycosis destruens in horses is reported to further characterize the disease and separate this condition from cutaneous habronemiasis as well as to show its importance as a disease of American horses. The clinical and pathologic features of these cases are essentially identical to those of the Florida horse leech and hyphomycosis destruens as previously reported.

Case 1

A mare 2 years old had a small cut on the posterior portion of the left rear fetlock which failed to heal under various treatments prescribed by an attending veterinarian. The skin at the edge of the lesion began to undergo necrosis, and the lesion spread around the fetlock so that finally the latter was surrounded by exuberant granulation tissue (Fig. 1). The mare spent much time lying in its stall, biting and rubbing the lesion. This process destroyed much of the immature granulation tissue on the surface and the lesion appeared to enlarge further by extension along the leg both dorsally and ventrally. Purulent exudate ran from fistulous tracts and occasional small firm yellow structures extended to the surface of the lesion.

Within a large mass of granulation tissue removed surgically were many firm, yellow, irregular masses of necrotic tissue varying from 1 to 10 mm. in diameter, some short and thick and others long, narrow, tortuous, and occasionally branching (Fig. 2). These masses could be dissected intact from the surrounding tissue. In some areas, the masses of necrotic tissue were several centimeters apart, but in other areas one to several of them were present in the same cavity.

The tendons and bones were not invaded by the infectious process. When the mare was euthanatized because of extreme debility approximately 8 months following the

first observation, the lesion was still enlarging by destruction of the adjacent skin.

Histopathology.—The deeper portion of the large mass of the excised tissue was composed of maturing granulation tissue, and the superficial part was young tissue with superficial necrosis and covered with purulent exudate containing bacterial colonies. The yellow masses were foci of coagulative necrosis which had sequestered from the surrounding tissue, and definite patterns of collagen bundles and blood vessels were identifiable within them. They were infiltrated with many neutrophils and eosinophils which were necrotic also. They were surrounded by pus and frequent reticuloendothelial cells. Occasionally, multinucleated giant cells were present. The outer margins of the necrotic masses varied from smooth to irregular because of smaller projections of necrotic tissue into the surrounding granulation tissue (Fig. 3). Gridley's fungus stains revealed branching and occasionally septate hyphae varying from 2.6 to 10.0μ in diameter scattered throughout the necrotic foci, but hyphae were most numerous at the periphery and about the

small arterioles which were present in the larger foci (Fig. 4). However, in the small early lesions, single hyphae were surrounded by a narrow zone of necrotic tissue. In the tissue at the edge of the ulcerated lesion, especially where the fungus invaded the skin, there were new areas of coagulative necrosis which had not undergone sequestration from the normal tissue. Eosinophils were present throughout the lesion but were most numerous at the ulcerated surface and about the foci of necrosis.

On examination of the debris of the necrotic masses from the lesions following their digestion with hot 10% sodium hydroxide, many of the typical branching, occasionally septate hyphae were seen.

Mycology.—Using aseptic procedures, 19 tubes of Sabouraud's dextrose and brain heart infusion agars were inoculated with small pieces of the yellow necrotic masses. From these, 19 pure cultures of a fungus were obtained. This organism was identified as *H. destruens*. This procedure was repeated once, and this organism was isolated again.



Fig. 2—Masses of necrotic tissue within granulation tissue excised from the fetlock of a horse (case 1). $\times 1$.

Case 2

A Shetland pony mare 18 months old had a swelling on the medial surface of the right hock where a bloody exudate issued from a small opening in the skin. Within about 6 weeks thereafter, the skin around the initial lesion rapidly ulcerated to form a lesion 8 by 10 cm. in diameter. Numerous small fistulous openings were present in the surface of the ulcerated area, and in these were yellow caseous masses similar to those in the mare described under case 1. The lesion continued to increase in size by peripheral extension in spite of therapy. The pony frequently gnawed at the lesion, apparently because of an intense itching. It died a few weeks after the first recognition of the lesion due to toxicity of an experimental drug.

Histopathology.—The histopathologic findings were essentially the same as those in case 1. The hyphae of the fungus in sections from the lesion measured 2.3 to 8.3 μ in diameter. Colonies of bacteria were present in the fistulous tracts surrounding many of the necrotic masses.

Mycology.—First attempts to isolate

fungus from the lesion failed because of an overgrowth of bacteria. Subsequent trials were successful when streptomycin and penicillin were added to the brain heart infusion and Sabouraud's dextrose agars. *Hyphomycetes destruens* was isolated in pure culture.

Case 3

A mare 3 years old was treated by its owner for about 4 months for a cut on the medial side of its right hock, which failed to heal. When the horse was first brought for professional attention, there were openings of fistulous tracts on the surface of the lesion, and purulent exudate could be expressed from the depths of these tracts. The lesion healed following surgery.

The mass of tissue submitted for pathologic examination contained several of the characteristic masses of firm, yellow, necrotic tissue.

Histopathology.—The lesions were essentially the same as those described in cases 1 and 2. Branching hyphae, occasionally septate, were identified within the ne-

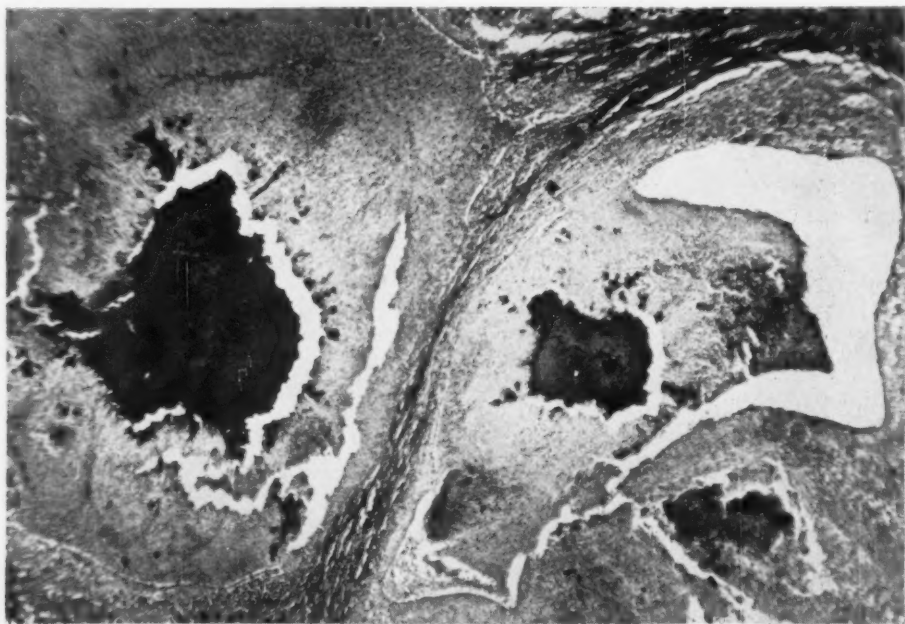


Fig. 3.—Two fistulous tracts contain necrotic tissue (dark areas) surrounded by purulent exudate and granulation tissue. The darker oval foci within these areas of necrosis are necrotic arterioles. H. & E. stain; $\times 24$.

crotic tissue. They measured 2.4 to 8.0 μ in diameter.

Mycology.—Pure cultures of *H. destruens* were isolated from the necrotic masses taken from the granulation tissue.

Case 4

Nearly a year previously, splinters of wood had lodged in the skin adjacent to the umbilicus of this 6-year-old mare. The lesion failed to heal and a veterinarian who examined the lesion removed several splinters. Subsequent to this, the mare had become foundered and was made to stand in a pond of water as treatment.

The lesion was a slightly raised, circumscribed mass of granulation tissue with an irregular peripheral outline bounded by skin. When excised the mass of granulation tissue measured approximately 14 cm.

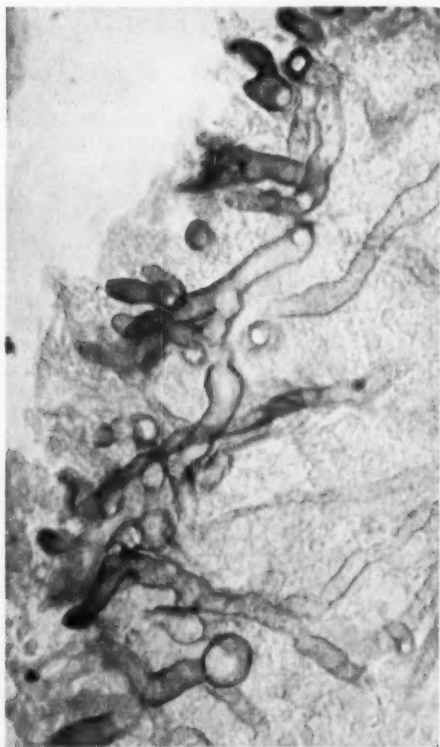


Fig. 4—Irregular branching hyphae of *Hypomyces destruens* at the edge of a mass of necrotic tissue. Gridley's fungus stain; \times 950.

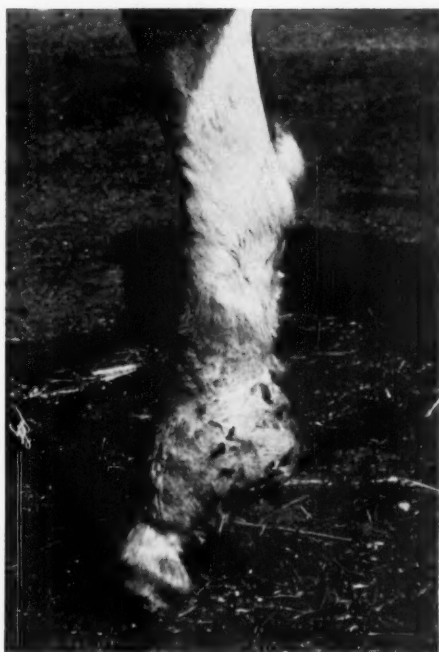


Fig. 5—Mass of granulation tissue of *hypomyces destruens equi* with numerous fistulas on fetlock of a Shetland pony.

in diameter and 5 cm. thick. Numerous fistulas contained characteristic necrotic masses. Some masses were long, tortuous, and branching; others, more oval, short, and thick.

Histopathology.—The basic characteristics were those described (cases 1, 2, 3). There were many branching hyphae in the necrotic foci, usually more numerous about the periphery. The hyphae in the tissue sections measured approximately 2.4 to 7.8 μ in diameter and had occasional septums.

Mycology.—Using slants of Sabouraud's dextrose agar, pure cultures of *H. destruens* were isolated from the necrotic masses of tissues taken from the center of the excised granulation tissue under usual precautions to prevent contamination.

Case 5

A mare 15 years old was brought for treatment of ulcerated lesions on the left cheek (Fig. 6). Lesions had been noticed in the skin adjacent to the left commissure of the lips about one year previously. They



Fig. 6—There are 2 ulcerated areas, thickened by granulation, and scars representing lesions of *hyphomycosis destruens* on the cheek of a horse (case 5).

appeared to heal and reappear repeatedly in different places. When she was first seen by us, there were 2 ulcerated areas on the cheek measuring 5 to 8 cm. in diameter. Several tortuous scars were present between the ulcerated lesions and the commissure of the lips. The ulcerated areas remained raw and bleeding because of frequent rubbing of the lesion by the mare, apparently because of itching.

Dissection of surgically removed tissues revealed yellow irregular masses of firm yellow necrotic tissue embedded in fistulas at the junction of the skin and the ulcerated mass of granulation tissue. No grossly visible foci were present in the center of the granulation tissue.

Histopathology.—Histopathologic changes were similar to those of the other cases.

Mycology.—*Hyphomyces destruens* was isolated from the necrotic tissue of these lesions.

Case 6

A mature mare was submitted to the veterinary clinic in late August, 1960, because of exuberant granulation tissue in

wounds which were anterior and just dorsal to the coronary bands of both rear feet. According to the available data, the lesions developed as a result of wire cuts which had been inflicted approximately 6 or 7 weeks previously. Surgical incision of the ulcerated areas which measured approximately 8 to 10 cm. in diameter revealed the characteristic firm yellow masses of necrotic tissue in the granulation tissue. The lesion on one foot extended ventrally between the wall of the hoof and the second phalanx and, because of this, surgical excision of all the morbid tissue was impractical. The lesions became progressively worse to the time of this writing.

Histopathology.—The microscopic changes were characteristic of the disease. The necrotic foci most frequently included small arterioles in their centers. With Gridley's fungus technique, the elastica of the walls of these arterioles as well as the typical hyphae of the fungus were stained. It was evident that these small necrotic blood vessels could be mistaken for the bodies of dead larvae.

Mycology.—Eleven tubes of Sabouraud's agar which were inoculated with parts or all of individual masses of necrotic tissue had colonies of *H. destruens*. One tube contained another fungus, also, which apparently was a contaminant.

Other Cases

Hyphomyces destruens was isolated from lesions on 2 additional horses. The disease in one followed a course lasting approximately 7 weeks and terminating in destruction of periarticular and peritendinous tissues of the right carpus. The other horse had a lesion on the posterior surface of the right fore fetlock. Both horses were euthanatized because of extreme debility.

A review of mycotic granulomas of the skin and mucous membranes of horses, in the files of the Department of Veterinary Pathology dating back for approximately 10 years, revealed reports of 15 additional cases with the characteristic clinical history and pathologic changes similar to those described here. Although the causative organisms were not isolated, those in the tissue had the morphologic characteristics of *H. destruens*. The hyphae, which were only occasionally septate, measured from 2 to 11 μ with the majority measur-

ing approximately 5 to 6 μ . Data on some were scarce but others were well documented.

The ages of these horses varied from 5 months to 11 years, and the duration of the lesions when first examined varied from 1 to 12 months. The location of the lesions on these horses were: mammary gland, umbilical area, axilla, and trachea, 1 each; fetlock, 7; neck, 2; and not recorded, 2. These lesions did not regress during the winter but became progressively larger. None healed spontaneously.

Discussion

The relative importance of these lesions of horses as described here is emphasized by the fact that of the 41 in which this disease or cutaneous habronemiasis was suggested, 23 were found to be mycotic granulomas, and 18 were diagnosed as cutaneous habronemiasis.

Special effort was made in this study to search for nematode larvae in these speci-

mens, but none were found. A concurrent study of sections taken from 18 horses known to have cutaneous habronemiasis, which were stained by Gridley's fungus technique, revealed no fungus. The study in India³ reported that "the diagnostic lesions of bursati are represented by kunkers and they are, histologically speaking, typical helminthic nodules, the same nematode larvae of *Habronema* species having been demonstrated consistently as forming the inciting nucleus for the production of the nodular lesions." Thus, it appears that, without even an occasional larva present in the horses we reported on, even concurrent habronemiasis is not likely.

Although the lesions in these horses were localized, some of them were not amenable to surgery or medicinal therapy when presented for veterinary care. Many have caused a loss of function which required euthanasia. The Indonesian study⁴ reported death in 4 of 7 horses with hyphomycosis destruens and healing of the le-

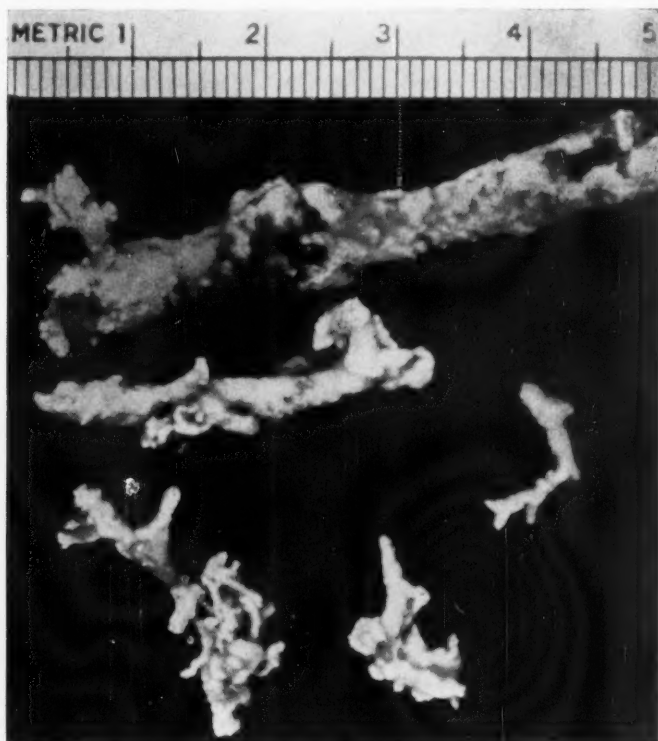


Fig. 7—Elongated branching masses of necrotic tissue from a horse with hyphomycosis destruens which took a rapid course. The centers of these masses are penetrated by necrotic blood vessels, thus explaining their shape. $\times 2$.

sions in the other 3 following surgery. It is obvious from our study that the pathologic process can produce a large lesion quickly and cause extreme debility in a few weeks.

The yellow necrotic foci of the mycotic

lesions usually are larger than those containing the nematode larvae of *Habronema*, but this factor cannot be used for differentiating them because of the overlapping in size between the 2. Intense itching appears

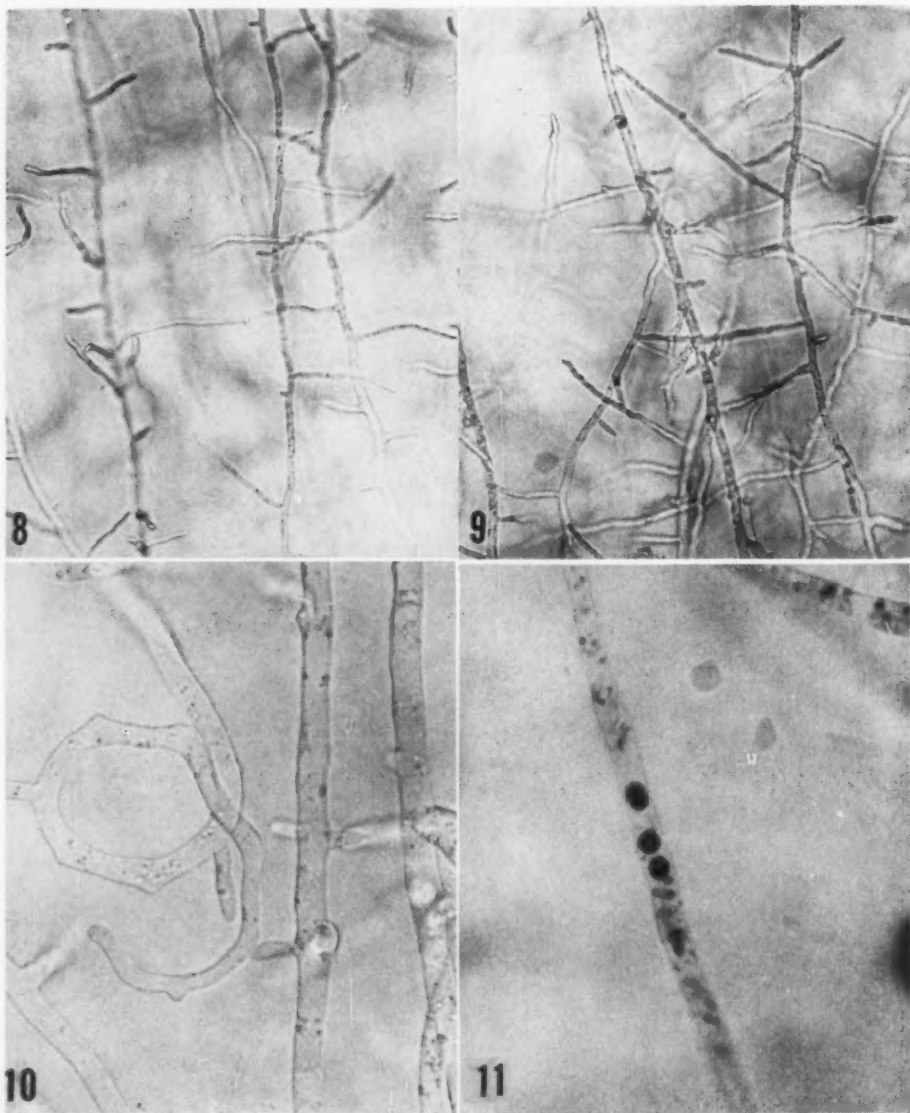


Fig. 8—Hyphae of *Hyphomyces destruens* with typical short lateral branches. x 690.

Fig. 9—Older hyphae which are typical in morphology and branching. x 690.

Fig. 10—Young coiled hyphae. In older coils, there may be many turns. x 690.

Fig. 11—Hyphae stained with Sudan black. x 690.

to be common to both diseases. The mycotic lesions become progressively worse with no indication of spontaneous healing, regardless of the season, whereas the lesions of cutaneous habronemiasis generally undergo spontaneous regression with the advent of cold weather which prevents reinfection with larvae.

Heavy infiltration of eosinophils are common to these mycotic granulomas and to cutaneous habronemiasis. The large number of eosinophils in this mycotic disease of horses probably has caused some pathologists to give a misguided presumptive diagnosis of cutaneous habronemiasis. Considering that cross sections of the larvae were not difficult to identify in tissue from the lesions of cutaneous habronemiasis and that none were found in the mycotic granulomas, one must conclude that the differentiation of these lesions by histopathology presents no major problem. However, in some of these lesions there was considerable distance and intervening granulation tissue between the necrotic masses, and it is easy to see how a small biopsy of the lesion could miss a focus of infection. This actually happened in some of the cases reported here. Multiple biopsies were necessary to obtain tissue with the yellow foci in which the fungus could be found. Inclusion of the firm, gray-to-yellow masses of necrotic tissue in the biopsy and their planting on suitable mediums are necessary for the demonstration of the fungus. The hyphae in these 23 horses measured 2.0 to 11.1 μ in diameter.

Although the hyphae are suggested by clear holes in the necrotic tissue, they could be identified definitely only by using special procedures such as Gridley's fungus stain. At this time, it is evident that other fungi may cause similar lesions in the mucocutaneous tissues of horses. A species of *Conidiobolus* has been isolated recently from granulomatous lesions in the nostrils of 3 Texas horses.² Also, *B. ranarum* Eidam has been isolated from a similar lesion on an Indonesian horse.³ Fungi similar to those reported here were isolated from the horses in Indonesia⁴ and from a similar lesion on a horse in France.⁵

The pathogenesis of *H. destruens* infections in horses remains to be demonstrated. The owners most frequently reported that the horses had been cut by a wire or scratched on some sharp object. There is considerable suggestion from

these cases that the organism invades the immature granulation tissue and its blood vessels, causing infarction and coagulative necrosis as it advances. The necrotic masses and the surrounding tissues are infiltrated by many eosinophils, neutrophils, and a few lymphocytes and plasma cells. Reticuloendothelial cells form at the edge of the necrotic tissue in some instances.

The epidemiology of the disease also should be of considerable interest when clarified. The owners of the horses described from Florida in 1893-1894¹ thought that the lesions developed following repeated or extended exposure of the horses to water, especially by wading in lakes and water holes. One author, who also considered leeches to be caused by a fungus, stated recently that in Florida it is contracted most frequently in low wet pastures and some pastures have a history of the occurrence of leeches.⁶

Fourteen of the 23 cases diagnosed in material collected over 10 years occurred during the period of July, 1959, to October, 1960. This was an unusually wet period which may have been a major factor contributing to the increased incidence of the disease during this time. Eighteen of the horses were from the Gulf Coast area of Texas. Two were from Florida.⁶ The others came from farms or ranches in the higher and drier areas, but all had access to ponds of water. These no doubt represent only a fraction of the cases which existed, because they represented only horses which were referred to the veterinary school for study or from which biopsies were submitted by veterinarians for histopathologic examination.

Although 2 investigators^{4,6} have not been able to reproduce the clinical disease by experimental inoculation of horses with fungi, another⁷ reported that he had reproduced bursattee by placing one of the necrotic masses containing hyphae into the skin of a horse.

Mycology

Hyphomyces destruens grows rapidly on many culture mediums. When incubated at 37 C. on glucose-neopeptone (Emmons' modification of Sabouraud's) agar at pH 7.0, a colony reaches a diameter of 6 to 7

⁶Contributed by Dr. William L. Sipple, director of laboratories, Florida Livestock Board, Kissimmee, Fla.

cm. in 2 days. The growth rate at 25 C. is about half that at 37 C. Acidification of this medium to pH 5.9 reduces the rate of growth only slightly. Additions to modified Sabouraud's agar of 400 mg./liter of chloramphenicol and 500 mg./liter of cyclohexamide greatly decrease the rate but do not inhibit growth of *H. destruens*. Growth is slow and scant on corn meal and Czapek's medium.

On modified Sabouraud's agar *H. destruens* forms a glabrous colony which is opaque and light gray. Some mutated or old strains of the fungus produce scant, short, aerial hyphae which give to the surface the appearance of short white felt. The surface of a typical newly isolated strain is faintly marked with sinuous radiating lines which mark the course of radial hyphae. On examination of a colony under the compound microscope at a magnification of 100, there are coarse, radiating hyphae of fairly uniform diameter (6 to 8 μ) with smaller lateral branches. Most of the branches leave the main hyphae at approximately right angles. The lateral branches are numerous and many of them are so short that they give the appearance of peglike lateral processes. As the culture ages, many of these branches elongate and rebranch (Fig. 8 and 9). A few loose coils of hyphae and intertwined or knotted hyphae can be found (Fig. 10).

Hyphae vary in diameter from 5 to 10 μ with occasional hyphae exceeding these limits. The walls are thick enough that, in many hyphae, both the outer and inner limits can be seen. There are few septums or cross walls. Therefore, the fungus is coenocytic, and protoplasmic streaming can be observed under certain conditions. The hyphae contain numerous hyaline masses of varying size and shape (Fig. 11). These have the appearance of lipid material and stain with Sudan black. Glycogen also is present. Rapidly growing cultures have a characteristic odor which suggests the production of both alcohols and esters, but study and identification of end products of metabolism have not been made.

The coenocytic mycelium consisting of wide branching hyphae is characteristic of a phycomycete. There are certain aspects of the fungus which suggest that it may be a species of *Mortierella*, but no type of sporulation has been observed. The available strains have been mated in all combinations with the hope of inducing sporula-

tion. Cultures have been grown on many enriched mediums including agar mediums enriched with blood, serum, coconut milk, oatmeal, vitamins, and fruit and vegetable decoctions. On some of the enriched mediums, growth was accelerated but no type of sporulation has been observed. This aspect of the study will be continued.

The derivation and manner of publication cast doubt upon the suitability of the name "*Hyphomyces destruens*" but, until further information is available concerning the true nature and relationships of this fungus, we do not propose a new name. At the present time the fungus can be placed only within the class, *Phycomycetes*.

Summary

Studies of the clinical, histopathologic, and microbiologic aspects of chronic, ulcerated, granulomatous lesions on horses have shown that 23 of 41 had mycotic granulomas.

A fungus was isolated from 8 of the 23 horses and identified as *Hyphomyces destruens*. The other 18 horses had lesions which were grossly similar to the mycotic lesions but actually were of cutaneous habronemiasis. Larvae of nematodes were found in none of the mycotic granulomas and fungi were found in none of the lesions containing parasitic larvae.

The mycotic lesions are characterized by chronic proliferative inflammation of the skin or mucous membranes of the legs, abdomen, mammary gland, neck, head, and lips. Within the granulation tissue are yellow-to-gray necrotic masses of tissue which appear to have formed by sequestration of infarcted tissue. The masses of tissue contain numerous branching, occasionally septate hyphae which are easily seen in sections stained by the periodic acid-Schiff (PAS) or Gridley techniques. Neutrophils and eosinophils are numerous throughout the surrounding granulation tissue and necrotic tissue.

The disease follows a chronic, progressive course, leading ultimately to loss of function of affected legs and extreme debilitation. The lesions do not heal during the winter as the lesions of cutaneous habronemiasis usually do. At the present time, radical surgical intervention appears to be the only satisfactory method of treatment. Metastasis of the fungus to other parts of the body has not been found.

Of the affected horses, all but 3 came from farms or ranches on the Texas Gulf Coast. Information obtained from the owners suggests that the infection follows accidental lacerations and cuts.

The fungus observed in tissues and isolated and studied in culture is designated for the present "*Hyphomyces destruens*." It appears to be a phycomycete and has some of the characteristics of *Mortierella*, but its failure to sporulate in culture has prevented final identification.

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Fats as Feed Additives Increase

Fats are now known to be essential components of animal feeds and currently more than 500,000,000 lb. of added fats are used annually. With the enormous increase in use of added fats in feed since 1954, important problems have arisen, such as specifications for fats suitable for feed use, effectiveness of and methods for incorporating suitable antioxidants, storage and handling of fats, and mixing of fats into finished feeds. Many studies have been made which relate the use of fat to nutritional requirements of our domestic animals.—*Util. of Fats in Poultry and Other Livestock Feeds, Util. Res. Rep. No. 2. USDA (Aug., 1960): 1.*

Radiographic Analysis of Equine Onchocerciasis

On radiographic examination of the withers of 470 clinically healthy horses, 2 months to 20 years old, 4 characteristic clinical signs of onchocerciasis were found: (1) single and multiple calcifications in the smooth muscle tissues (45.3%); (2) osteolysis of the spinous processes in the form of single or multiple round, oval, or polygonal bone defects, with or without a reactive sclerotic border (3.8%); (3) deposition of calcium salts inside lacunae formed by osteolysis and complete or incomplete repair of these lacunae; (4) osseous metaplasia varying in shape but with clear contours and nonhomogenous shadows (1.3%).

In 93.8 per cent, radiographic alterations were localized in the smooth muscle and bone tissues in the region on the spinous processes of the first, second, and third thoracic vertebrae.—*Vet. Archiv, 30, 1960: 250.*

An Evaluation of Uterine Infusion as a Treatment for "Repeat Breeding" in Dairy Cattle

C. A. Hjerpe, D.V.M.

IT HAS BEEN established that "repeat breeding" in dairy cattle is a major economic problem. Causes of repeat breeding fall into 2 basic categories (1) failure of fertilization and (2) early embryonic death.

The numerous causes of failure of fertilization are thought to be responsible for 35 to 45% of repeat breeding in cattle.^{1,2,10,20,21} These causes are:

A) Obstructions of the oviducts, due to adhesions, cysts, tumors, tuberculosis, pyosalpinx, salpingitis, or hydrosalpinx, have been found to be responsible for 2 to 9% of repeat breeding.^{1,3,14,16,20,21}

B) Abnormalities of ovulation, such as failure of ovulation, delayed ovulation, and superovulation, are considered responsible for 3 to 5% of repeat breeding.^{3,10,20,21}

C) Inability of the ovum to become fertilized, due to gross defects, degeneration, or rupture of the ovum, has been reported in 2.0 to 9.5% of repeat breeders.^{2,3,14,21} Perhaps many other ova have defects which are not demonstrable with present techniques.

D) Inability of the sperm to fertilize is thought to be the most common cause of failure of fertilization in normal cows.^{1,14,16} The sperm may be inherently defective or adversely affected by such things as inflammations of either the male or female reproductive apparatus or by improper handling or processing. Failure of fertilization occurred for "no apparent cause" in 24 to 39% of repeat breeding cows.^{2,20,21} It is unlikely that a large proportion of these unexplained failures are caused by this 4th factor. Recent evidence tends to minimize the role of catarrhal genital inflammations in bovine infertility.^{2,3,15,17,19,22} Moreover, the average fertility of semen and the average time of insemination are the same for fertile cattle and repeat breeders under the conditions of commercial artificial breeding.

Early embryonic death is held responsible for 20 to 30% of repeat breeding.^{3,20,21} Some causes are:

A) Congenital or genetic defects of the fertilized ovum or embryo may render it less able to survive.

B) Delayed fertilization raises the embryonic mortality rate.²⁰

C) Devitalization of the fertilized ova or of the embryos may be caused by brucellosis, vibriosis, trichomoniasis, miscellaneous bacteria, and possibly certain viruses.

D) Disturbed environment of uterus and oviducts, due to bacterial or viral inflammations, hormonal imbalances, or unknown factors, may increase embryonic mortality.

With the advent of artificial breeding, trichomoniasis and vibriosis have largely been controlled. The virtual eradication of brucellosis and tuberculosis in dairy cattle and the absence from this country of certain infectious causes of infertility, such as specific bovine venereal epididymitis and vaginitis, and lumpy skin disease, have further helped to narrow the field. Nutritional deficiencies result in failure of estrus rather than repeat breeding, and need not be considered.

Granular vaginitis has largely been discredited as a cause of repeat breeding. The cystic ovary syndrome, with its irregular heat cycles, is readily diagnosed by most farmers and is not categorized as a cause of repeat breeding. Hereditary and congenital causes of repeat breeding, the most frequent cause being arrested development of the müllerian duct system, are usually diagnosed by careful vaginal and rectal examinations. Ovarian, uterine, and cervical neoplasms; marked ovarian or uterine adhesions; pyosalpinx; hydrosalpinx; and severe endometritis, cervicitis, and vaginitis are all readily diagnosed. Unfortunately, these easily recognized organic causes of repeat breeding are responsible for a small percentage of the specific cases. This may be a hidden blessing since treatment is rarely successful.

The treatment of cattle for repeat breeding has mainly been empiric, reflecting our ignorance of the basic causes of infertility,

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as well as our lack of understanding of the histophysiology, biochemistry, and endocrinology of normal reproduction. It is unlikely that any one factor is responsible for repeat breeding, and no single method of treatment is going to be adequate. The basic causes must be discovered and practical differential diagnostic techniques made available to the clinician. When specific therapy can be directed toward accurately diagnosed malfunctions, progress can be made.

In the absence of adequate recognition of the basic causes of infertility, the tendency has been to seize upon "subclinical endometritis" and "hormone deficiencies" as the major or sole causes of repeat breeding. Uterine infusion, with various antibiotics, sulfonamides, and antiseptic solutions, has been used as treatment for subclinical endometritis. Female sex hormones are being used.

Review of Literature

A casual search of the literature would lead one to believe that the genital inflammations caused by miscellaneous bacteria have definitely been proved to be the major cause of repeat breeding.^{9,10,13,19,24} However, in recent years, research workers have published data that tend to minimize the importance of endometritis. One group⁵ cultured cervical mucus from 207 cows. Cows harboring pathogens were allotted into control and tetracycline-treated groups. There was no difference in conception rates among control cows harboring pathogens, treated cows, and bacteriologically negative cows.

Other workers²² studied a group of 48 repeat breeders. Half were used as controls and half were treated with antibiotics. Thirty-four days after insemination, the cows were slaughtered and examined for the presence of embryos. Conception rates were 34.8% for treated cattle and 56.0% for controls. The histopathologic findings in uteri from 109 repeat breeders was studied and the investigators¹⁸ concluded: (1) "The endometria of the repeat breeding cows did not differ greatly from that of apparently normal heifers." (2) "Endometritis, in otherwise normal repeat breeding cows, was not a major cause of repeat breeding."

A 4th group of workers² was unable to

demonstrate any significant difference in conception rates between control cows and those treated with chlortetracycline intra-uterinely 24 hours after parturition. In a similar experiment, using neomycin sulfate and oxytetracycline, another worker¹² noticed an increase in the number of services per conception in the treated cattle over controls. Metritis is a normal postpartum occurrence, and may be necessary in the normal "clean-up" and involution of the uterus.

Two workers¹⁵ infused the uteri of virgin heifers with pathogenic bacteria isolated from the uteri of infertile cows. Subsequent conception rates, as compared with controls, were not affected. Pathogenic bacteria, placed in the uteri of the same heifers postparturiently, had no effect on subsequent conception rates. Another worker¹⁷ treated 599 repeat breeder cows with various combinations of antibiotics, sulfonamides, and antiseptics. He was unable to demonstrate any significant difference in conception rates between individual treatment groups or between treated cows and large numbers of cows bred artificially with antibiotic-treated semen.

Delayed ovulation is probably a minor cause of repeat breeding.²³ It is thought to be a luteinizing hormone deficiency and to be related to the cystic ovary and cystic corpus luteum syndromes. Treatment has been attempted with estrogens,¹⁷ progesterone,¹⁶ and luteinizing hormone¹⁶ early in estrus; by delayed breeding; and, recently, by administering follicle-stimulating hormone (FSH) 3 days before the next expected estrus.¹² A worker treated 58 repeat breeder cows with FSH in this manner, and only 12 conceived.¹² Administration of estrogen early in heat will delay ovulation⁸ and has not been proved successful in the treatment of this or any other type of repeat breeding.^{16,17} Progesterone, administered early in estrus, will hasten ovulation.⁷ However, a group of workers⁶ reported no increase in conception rate over controls in 36 repeat breeders treated early in heat with progesterone. Forty repeat breeders treated similarly with chorionic gonadotropin had a significant decrease in conception rate compared with controls. Similarly, it has been shown that inseminating cows twice at 24- to 48-hour intervals does not increase the conception rate.⁴

The cystic corpus luteum syndrome is a

recently elucidated cause of repeat breeding. These cows have normal estrous cycles but fail to conceive. Diagnosis is only possible by rectal examination at midcycle. Treatment with 50 mg. of repository-type progesterone has been suggested²⁵ but has not been critically evaluated. The relative importance of this condition as a cause of infertility is unknown.

Much has been made of progesterone deficiency as a cause of repeat breeding. Several forms of the hormone have been administered at various times during the estrous cycle.¹¹ No critical evaluation of this therapy has been made. One group of workers,⁴ in a limited study, did not find evidence of progesterone deficiency in corpora lutea from repeat breeding heifers as compared with control heifers.

Materials and Methods

Repeat breeding cattle should be examined and treated when they return to service the 3rd time. My standard treatment is uterine infusion with antibiotics. It is generally performed approximately 24 hours postservice. Occasionally, a cow is treated a few hours postservice or 48 hours postservice if more convenient.

The purpose of this study was to evaluate, under practice conditions, the efficacy of uterine infusion during estrus as a treatment for repeat breeding cattle which have normal estrous cycles, are free from pronounced genital disease, and have been inseminated with antibiotic-treated semen.

From July 16, 1958, to July 5, 1959, the uteri of all repeat breeding cattle were infused with 300,000 units procaine penicillin G and 1 Gm. of dihydrostreptomycin sulfate in 10 cc. of 0.9% saline solution. Just prior to infusion, a careful rectal examination was made of the cervix, the body and both horns of the uterus, both oviducts, ovaries, and ovarian bursae. Pregnancy or any significant pathologic finding was recorded. No visual examination of anterior vagina or cervix was done. The breeding record was examined, and the owner was questioned about abnormal occurrences at parturition, inception and character of signs of estrus, time of insemination, character of vaginal mucus, and any previous breeding problems. Seldom were answers helpful in determining the basic cause of the infertility.

Then, with one hand in the rectum, a Chamber's uterine catheter was directed through the cervical canal and about 1 inch into the body of the uterus, where about 7 cc. of the suspension was deposited. Then the catheter was partially withdrawn, and 3 cc. was deposited in the cervical canal. The uterine horns were then massaged to distribute the suspension.

Even in cows in which the cervix was indurated,

great difficulty was not encountered in catheterization. It is unlikely that cervical stenosis is a common cause of infertility. In 60 to 70% of the cows, no trace of genital disease was found.

The cows were in a total of 41 brucellosis-free and artificially bred herds. Seven of the cows were in 2 herds infected with leptospirosis during at least part of the study. Most cows were grade Holstein-Friesians and Guernseys, and all age groups were represented.

From July 6, 1959, until June 14, 1960, the uteri of all repeat breeders, bred for the 5th time or less, were infused with 10 cc. of 0.9% saline solution. These cows served as controls. Cows, being bred for the 6th time or more, were infused with antibiotics as usual.

During the study, 99 repeat breeding cattle were treated by uterine infusion. Of these, 9 were excluded from the study because they had been bred naturally since the previous parturition. Because of marked genital disease, 9 other cows were excluded. Conditions encountered included purulent vaginal discharge (5 cows), luteal cyst (1), bilateral hydrosalpinges (1), lymphomatosis (1), pneumovaginitis (1), uterine adhesions (1), and cystic ovaries (2).

Cows having less obvious abnormalities (minor ovarian adhesions; slightly cloudy vaginal mucus; cervical indurations; delayed ovulation; history of dystocia, retained fetal membranes, or abortion; or one or more edematous, flaccid, thickened, or enlarged uterine horns) were not excluded from the study.

While visiting the herds in the course of routine practice, cows that had been in estrus since treatment were identified. If not in estrus, pregnancy was confirmed, usually by rectal palpation or abdominal ballottement but occasionally by noticing the subsequent calving date. After pregnancy was confirmed, no attempt was made to determine whether the calf was carried to term. If the cow was returned to service, no attempt was made to determine whether she subsequently became pregnant.

Results

A total of 45 repeat breeding cows were treated by uterine infusion and streptomycin over 2 years. Of these, 28 cows (62.2%) became pregnant after treatment and service.

TABLE 1—Conception Rates of Antibiotic-Treated Cows

Services (No.)	Cows (No.)	Pregnancies (No.)	Conception rate (%)
2	1	1	100.0
3	22	15	68.2
4	12	7	58.3
5	3	3	100.0
6*	4*	2*	50.0
7*	3*	0*	0.0
Totals	38	26	68.4

*These cows not included in total.

TABLE 2—Conception Rates of Control Cows

Services (No.)	Cows (No.)	Pregnancies (No.)	Conception rate (%)
2	3	1	33.3
3	18	12	66.7
4	10	6	60.0
5	2	1	50.0
Totals	33	20	60.6

Since there were no controls (given 0.9% saline solution) in the group of cows bred for more than the 5th time, it was decided to exclude this group from the antibiotic-treated cattle in order to obtain a fair comparison. Of the 38 antibiotic-treated cattle being bred for the 5th time or less, 26 cows (68.4%) became pregnant following treatment and service (Table 1). Of the 33 control cows, 20 (60.6%) became pregnant after treatment and service (Table 2). The difference in favor of the antibiotic group is not significant. ($P = 0.30$ to 0.50 by the *chi* square test).

At 24 hours postservice, 6 cows had not yet ovulated. These cows were all rebred within a few hours. There was no increase in conception rate as result of this late-breeding therapy. The conception rate after treatment and service was 50% in both the 2 antibiotic-treated cows and the 4 control cows.

Nine repeat breeding cows in 8 herds had been served naturally at some time since the last parturition. These cows were treated by uterine infusion with antibiotics. The 66.7% conception rate is similar to that obtained with controls. However, 2 of 3 failures were 10th-service cows. If these cows that were probably hopelessly sterile were excluded, the case for infusion of naturally served repeat breeders would look better. Probably, some of these cows were affected with vibriosis and would be expected to benefit from uterine infusion with streptomycin.

Discussion

In my opinion, there is no treatment which has been proved to be of significant value for repeat breeding cattle that are free from obvious genital diseases and inseminated with antibiotic-treated semen. It is unlikely that any one factor is the major cause of infertility in these cattle and, consequently, no single treatment can be expected to give entirely satisfactory results. More research is needed to discover the basic causes of repeat breeding. If the

causes can be found, effective treatments will soon follow.

Summary

A treatment of repeat breeder cattle by uterine infusion of antibiotics was evaluated by comparing the conception rate after treatment and service with the conception rate of control repeat breeder cattle infused with 0.9% saline solution. No statistically significant difference was demonstrated.

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Coliform Infection Associated with "Milk Fever" in Sows

In a study of puerperal septicemia in sows, it was found that an increase in polymorphonuclear leukocytes and blood sedimentation rate and inflammation of the udder tissue by the 4th day were characteristic. In samples taken from the uterus, udder, and blood, *Escherichia coli* was isolated; it was the same serotype as was found in the intestines.

Attempts to infect normal sows indicated that the condition involved several factors, such as the serotype of *Esch. coli*, the characteristics of the individual sow, and the physiologic state of the sow.

It was concluded that disease is caused by an infection developing shortly after parturition and that *Esch. coli* plays an important role.—*Vlaams Diergeneesk. Tijdschr.*, 29, (Nov., 1960): 311.

Congenital Porphyria in Cattle

According to studies conducted in Denmark on congenital porphyria in cattle, this condition can be distinguished clinically by the light reddish tint of the teeth, the photosensitivity of the skin, the periodic reddish discoloration of the urine, and the deterioration in physical condition. Confirmation of the diagnosis depends on the chemical analysis of the urine, feces, teeth, and bones. A simple test consists of the examination of the teeth or bones in Wood's light; a red fluorescence is regarded as diagnostic of porphyria. This examination may be performed on the teeth of the living animal.

As a result of these investigations, it is now common practice in Denmark to perform a systemic chemical examination on all bulls used for artificial insemination and sometimes on their offspring.—*Brit. Vet. J.* (Feb., 1961): 72.

Ventricular Septal Defect in the Bovine Heart

—Report of 3 Cases

Theodore H. Belling, Jr., D.V.M., M.S.

THE OCCURRENCE of congenital anomalies, of which ventricular septal defect is one, are numerous. Congenital anomalies occur as a result of abortive development in one or more of the 3 primordial germ layers and are manifest in many ways at birth.

Review of Literature

A review of the literature indicated that known cases of congenital anomalies of the heart of domestic animals are not as numerous as other types of anomalies,^{1-4, 9, 11-12, 15-18, 20, 22, 25, 30, 31, 34-36, 39, 41-43} and that such anomalies resulted from nutritional deficiencies, heredity, disease, and other known and unknown causes. Some investigators²⁵ were able to produce skeletal as well as soft tissue defects when they fed pteroylglutamic acid-deficient diets to pregnant rats during various stages of the pregnancy. One of the soft tissue abnormalities that was produced was a ventricular septal defect. These investigators and others^{7, 24} produced similar results in rats fed the riboflavin antimetabolite, galactoflavin. In these cases, skeletal defects appeared with the highest frequency, followed by cardiovascular changes such as ventricular septal defect and variations of the aortic arch pattern. This was also accomplished by pantothenic acid-deficient diets.³⁹

In a report of patent ductus arteriosus in Hereford cattle³⁸ and of ventricular septal defect in chickens,³² a genetic factor was implicated.

Pulmonary valvular stenosis, to which no specific cause was attributed,^{7, 8, 27, 37} was described in dogs. In one report of occurrence of interventricular septal defect in dogs, the author believed that inheritance played a small part in congenital heart disease in the dog.^{7, 8} Septal defects were found in 15 cattle with cardiac anomalies out of 4,500 necropsied.³⁸

Another investigator²⁸ observed such defects in 18 of 37 defective bovine hearts. An interventricular septal defect associated with other malformations of the hearts of 3 calves, and the occurrence of 6 cardiac anomalies out of 2,000 cattle necropsied, has been reported by another investigator.³⁰ Others have also reported the occurrence of bovine septal defects.^{5, 14, 19}

Case Histories

Three cattle with interventricular septal defects were found in a small purebred Hereford herd within a 2½-year period. During this time, there were 116 births by 65 cows. Deaths of 14 calves were recorded during this period with the causes of death listed as dystocia, pneumonia, pneumo-enteritis, prematurity, ruptured abomasum, and cardiac septal defect.

Case 1.—A 3-day-old heifer calf was brought to the clinic to be treated for scours. It had severe diarrhea, severe dehydration, subnormal temperature, and a cardiac bruit. Treatment was unsuccessful and the calf died. On necropsy, a hole 1 cm. in diameter was found in the septum membranaceum.³³ There was over-riding of the defect by the semilunar valves of the aorta, thereby placing the aorta above both ventricles. Over-riding was to be expected in the presence of a membranous septal defect.⁶

Case 2.—An 8-month-old heifer was brought to the clinic for treatment of pneumonia. Her condition was poor and, according to the herdsman, in spite of a good appetite and adequate nutrition, she had been that way from birth. Examination revealed, in addition to the pneumonia signs, a severe cardiac bruit. Therapy was unsuccessful.

On necropsy, hydrothorax, hydroperitoneum, bronchopneumonia, congestion of the lungs, passive congestion of the liver, and

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Fig. 1—Heart from calf (case 2). Pointer indicates absence of aorta. Notice the fused aorta and pulmonary trunk (A); the right atrium (RA); and the left atrium (LA).

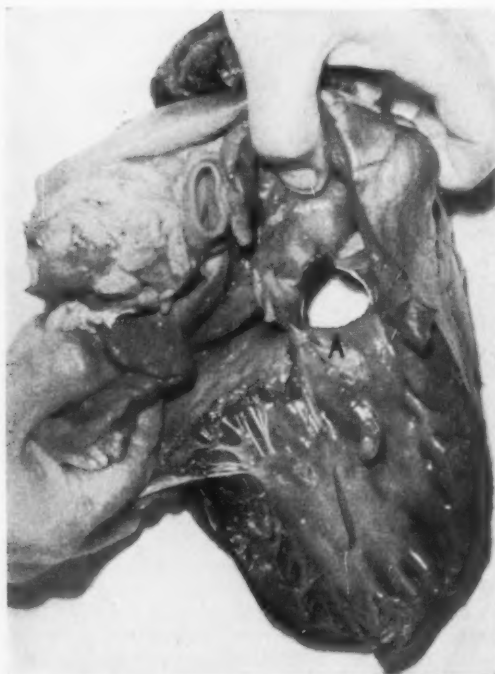


Fig. 2—Heart from calf (case 3). Septal defect (A) was 4 cm. in diameter.

hypertrophy of the right ventricle with an associated rounded apex of the heart were found. The lesion, which was 4 cm. in diameter, was associated with a fusion of the pulmonary artery and the aorta (Fig. 1). The semilunar valves of the fused structure opened directly above the defect.

Case 3.—An 8-month-old bull calf was brought in to be treated for pneumonia. The history of this calf was similar to that of the heifer described in case 2. Examination revealed a pronounced cardiac bruit. Treatment was not attempted on this calf, and it died shortly thereafter. A necropsy was not performed, but the heart was salvaged. Hypertrophy of the right ventricle and a rounded apex was present as in the heart of the calf in case 2. A septal opening was found that measured 4 cm. in diameter (Fig. 2). A stenosis of the opening of the pulmonary trunk was also present. The pulmonary valves were vestiges rather than normal functioning valves (Fig. 3). The valvular development associated with the stenosis was different from what has been previously described.^{5,7,8,27,37}

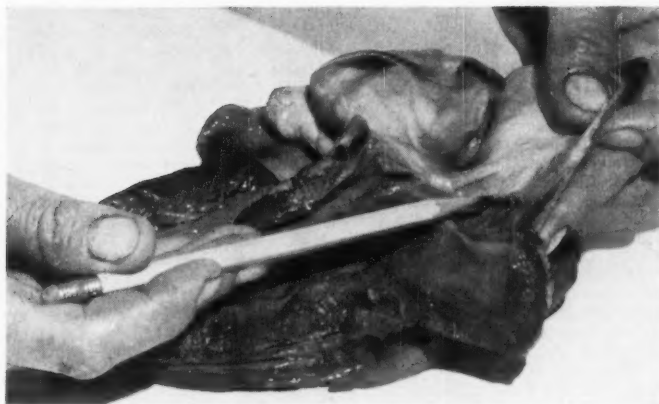
The genetic backgrounds of the 3 calves were examined in an attempt to establish a genetic relationship in these cases of interventricular septal defect. The pedigrees indicated that this condition could be inherited as a simple autosomal recessive since the defective calves had several common ancestors.

Discussion

When attempting to reproduce congenital anomalies, it is essential to begin and continue the insult, whatever it may be, during the state of development of the embryo termed the "critical stage." The embryo is most susceptible to changes in its environment and its development is most easily interrupted or altered during this period. In many cases, a genetic factor can be proved as the cause of a congenital anomaly. In other cases, in which there is a suggestion of a genetic factor, it is possible that a genetic weakness may manifest itself more strongly through a chance alteration in the fetal environment because of disease, change in nutrition, or other supposedly innocuous management practices.

It is conceivable that the incidence of congenital heart lesions is higher than recorded, since many young range beef ani-

Fig. 3—Heart from calf (case 3). Pointer indicates vestige of pulmonary valve.



mals die without being examined postmortem. It is difficult to establish any genetic relationship when an affected calf is found in a commercial operation. One must rely on a small percentage of the purebred herds to obtain these facts.

The genetic implications in these cases, though apparent, were difficult to assess because routine necropsies were not performed prior to 1957. The mode of inheritance and the source of the gene or genes causing the condition were not definitely established. The variations in the defects added to the difficulty in properly assessing the genetic factors. It was possible that other calves in previous generations had the same defect, but went unnoticed.

There were not cases of the tetralogy of Fallot.⁵ Calf 1 did not have pulmonary stenosis; calf 2 had a fusion of the pulmonary artery and aorta; and calf 3 did not have functional pulmonary semilunar valves. A diagnosis of over-riding by the aorta was made in all 3 calves rather than dextroposition because, as has been stated, "The degree of over-riding depends upon the magnitude of rotation of the aorta and pulmonary artery and also on the extent that the ventricular septum bulges into the right ventricular cavity. Furthermore, the plane in which the muscular septum and aorta lie is such that any straightening out of the aorta directs the aortic valve even more strikingly toward the right ventricular chamber."⁶

Summary

Within a 2½-year period, 3 calves in a

small purebred Hereford herd were found to have interventricular septal defects. The defects are described and the possibility that they were due to inheritance is discussed.

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Brucellosis in Man Is Highest in Iowa

Iowa led the nation with 272 cases of brucellosis in human beings during the 1st 40 weeks of 1960. This was more than 5 times as many cases of this disease in man as occurred in any other state. The Iowa total amounted to 43.9% of all human brucellosis cases in the United States.

The high incidence of the disease in Iowa is believed to result from the fact that the disease is widespread in Iowa swine herds and is not controlled in all cattle herds.—*Iowa State Univ. Information Serv.*, March 11, 1961.

Mineral Nutrients for Livestock

Allen D. Tillman, Ph.D.

IT HAS BEEN ESTIMATED¹⁴ that 60% of veterinary practice involves noninfectious diseases, including those of nutritional origin. In most cases, severe mineral deficiencies are obvious and can be corrected by supplying a dietary source of the missing mineral. Although the acute conditions are important, the greatest loss in livestock production results from borderline deficiencies. In animals with borderline deficiencies, there are no definite clinical signs. Metabolic functions simply slow down to comply with the level of the limiting nutrient; slower growth with less efficiency results. To prevent these borderline or subclinical conditions, requirements of minerals for adequate nutrition must be met.^{1-9,6,7,15} Recent changes in methods of production, with increased emphasis on faster growth by use of various adjuncts, tend to increase the incidence of both borderline and acute cases of mineral deficiencies.

The essential minerals for animals include calcium, chloride, cobalt, copper, iodine, iron, magnesium, manganese, molybdenum, phosphorus, potassium, selenium, sodium, sulfur, and zinc. Proof that these are essential minerals is based upon the effects that variations in amount have upon structural or functional changes within the body. Typical deficiency syndromes have been adequately described.^{3,6-9,12,15,18,20}

The dramatic results which have been obtained from feeding animals small amounts of copper and cobalt in deficient areas have focused attention on mineral deficiencies, especially these 2 minerals. However, the most common and important mineral deficiency in this country is that of phosphorus. Signs of acute and borderline deficiency are common. Phosphorus deficient animals are not able to efficiently utilize feed for growth or reproduction, and a severe deficiency of phosphorus is often

diagnosed as a severe attack of parasites or simply starvation. Since phosphorus is concerned in fat metabolism, phosphorus-deficient animals do not fatten.

A depraved appetite is common in cattle with acute deficiencies and the animals will consume⁷ solid objects such as bones, wood, and nails. Borderline deficiency of phosphorus also affects appetite.¹⁹

Although it is practically impossible to diagnose borderline cases by simply examining the animal, several criteria, such as chemical determination of plasma inorganic phosphorus, composition of the ration, and observation on over-all performance of the animals, allow a fair degree of accuracy in diagnosing this condition. Plasma inorganic phosphorus levels have been used by research workers to measure the state of phosphorus nutrition in animals. Normal values are given (Table 1).

Many factors affect plasma inorganic phosphorus levels, thus normal values do not always assure one that the animal is receiving adequate phosphorus nutrition; however, low values almost conclusively indicate inadequate phosphorus nutrition. Signs of phosphorus deficiency are more likely to occur under pasture conditions. Supplementation is advisable when the phosphorus level of pasture forages drops below 0.15% of the dry matter.

Calcium, a principal mineral, often becomes a limiting factor in animal nutrition. Although supplemental calcium is needed in most rations of swine, poultry, and lactating dairy cows, it is not likely to be deficient in the diets of range beef cattle or sheep. The utilization of dietary calcium and phosphorus is affected by vitamin D and the ratio of calcium to phosphorus. The ratios which deviate from the optimum Ca:P range of 1:1 to 2:1 are particularly damaging when the intake of calcium and phosphorus is limited. Although most grain rations for dairy cows contain more phosphorus than calcium, the practice of adding

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TABLE 1—Plasma Inorganic Phosphorus Levels and Dietary Phosphorus Requirements

Animal	Normal plasma inorganic P (mg./100 cc.)		Normal growth and maintenance dietary requirement of P (% of dry matter)		
	Young	Mature	Young	Mature	Lactating
Dairy cattle	5-7	4-5	0.30	0.13	0.25
Beef cattle	5-7	4-5	0.21	0.15	0.18
Sheep	5-6	4-5	0.19	0.16	0.20
Swine	5-8	4-6	0.45	0.40	0.40

limestone to all grain mixtures is not justified,⁴ particularly if legume hay is the roughage. In fact, adding calcium to certain rations decreases⁵ the digestibility of protein and available energy. Increasing the calcium level in swine rations containing a constant level of phosphorus⁶ resulted in a progressive decline in growth. Zinc supplementation has been effective in preventing and treating all swine parakeratosis⁷ when fed at levels of 50 to 100 p.p.m. It appears that the phytic acid complex of soybean seed proteins and possibly other proteins^{10,17} chelates zinc, thereby increasing the dietary zinc requirements of non-ruminants in certain rations. The resulting deficiency is aggravated by high levels of calcium, thus the reduction of calcium levels has also been effective. The dietary requirements for calcium are shown (Table 2).

TABLE 2—Calcium Requirements of Animals

Animal	Ca requirement (% of dry matter) for		
	Young	Mature	Lactating
Dairy cattle	0.26	0.14	0.30
Beef cattle	0.29	0.14	0.24
Sheep	0.21	0.20	0.28
Swine	0.65	0.60	0.60

Supplemental salt supplies essential sodium and chlorine and aids in maintaining proper osmotic pressure in blood, interstitial tissues, and cells. In addition, it is important in digestion and respiration. A deficiency of salt will cause depraved appetite, which results in chewing of wood or soil by ruminants. Supplemental salt is a constant need for all livestock; therefore, many practitioners recommend that it be fed free choice. If fed in this manner it can become an effective carrier for trace minerals and feed additives. When salt is added to the complete or grain ration, concentrations of 0.25 to 1.0% have been employed. Although most producers are aware of the importance of salt in livestock production, there are still many situations in which a salt deficiency could occur. For example, salt blocks may be too hard or they

may be unpalatable because of an added anthelmintic. Under most conditions, in which sensible concentrations of salt are supplied for day by day consumption and water is available, there is little likelihood⁴ of salt deficiency.

Cobalt, copper, iron, and zinc requirements for cattle, sheep, and swine are given (Table 3). Cobalt deficiency occurs

TABLE 3—Cobalt, Copper, Iron, and Zinc Requirements of Animals in p.p.m. of Dry Matter

Animal	Cobalt	Copper	Iron	Zinc
Dairy cattle	0.07	5	80-150	30
Beef cattle	0.07	5	80-150	30
Sheep	0.08	5	80-150	30
Swine	0.04	4	80-150	40-50

in almost all areas of the⁷ world and new deficient areas are being recognized every year. Borderline cases of cobalt deficiency probably are frequent, unrecognized, and limiting factors in the production of sheep and cattle. Cobalt-deficient animals are anemic, thin, and usually fail to shed their old coats; they appear emaciated and are heavily infected with parasites. In fact, cobalt-deficient animals are more susceptible to parasitic infestation. Cobalt apparently functions as a part of vitamin B₁₂, which is necessary for hematopoiesis. Signs of cobalt deficiency are observed primarily in grazing ruminants consuming forages which contain less than 0.07 p.p.m. of cobalt.²⁰ Under most circumstances, cobalt is best given to the grazing animal in the form of a mineral supplement. For example, 8 Gm. of cobalt sulfate added to 100 lb. of salt⁹ will supply enough cobalt for most ruminants.

Copper is another important trace element. It functions as a catalyst in hematopoiesis. A deficiency of this element occurs primarily in the peat or high organic soils throughout the world. The copper-deficient animal is anemic because of the poor utilization of dietary iron. Copper-deficient animals have abnormally high levels of iron

in the liver. A deficiency of condition in cattle and sheep appears when the copper level of the forage falls below 5 p.p.m. In swine, the lower level is approximately 3 p.p.m. In some areas, typical signs of deficiency—fragile bones, graying of coat, scours, anemia, and accumulation of iron in the liver—appear in spite of the forages containing more than 5 p.p.m. of copper.⁷

Presence of molybdenum is antagonistic to copper and interferes with the utilization of copper. The presence of 5 p.p.m. of molybdenum in forages may result in signs of acute copper deficiency, although the diet contains 5 to 7 p.p.m. of copper. Inorganic sulfate²⁰ is apparently involved in the interaction of copper and molybdenum, but this knowledge is still incomplete. Treatment of copper deficiencies in animals can be accomplished by either oral or intravenous administration of copper salts.²⁰

Iodine deficiency appears to be localized and can be easily prevented¹² by adding stabilized iodine to salt.

Most pastures and feeds supply adequate levels of sulfur to meet the requirements of livestock. It is possible that sulfur may be a limiting factor in ruminant digestion, especially if urea is a source of ration nitrogen. It is believed that 0.3 to 0.5% of dietary sulfur will meet all needs and that supplementation with inorganic sulfates would be beneficial if the level were below 0.3%.

Poultry need about 50 p.p.m. of manganese in their diets; otherwise perosis occurs. This value is too high for other livestock (Table 4), and it appears that most

TABLE 4—Iodine, Manganese, Sulfur, and Magnesium Requirements of Animals

Animal	Iodine (mg./day)	Manganese (p.p.m.)	Sulfur (%)	Magnesium (%)
Dairy cattle	400-800	15-30	0.5	0.05
Beef cattle	200-400	15-30	0.5	0.05
Sheep	50-100	15-30	0.5	0.05
Swine	80-160	30-40	0.5	0.05

rations supply more than the minimal levels required by cattle, swine, and sheep. In fact, in some parts of the world, manganese toxicity may be a problem, although evidence for this is not concrete.

A deficiency of magnesium seems to be more common in cattle than other species of farm animals. Since grass tetany, which commonly occurs in cattle consuming lush, young cereals or hays having low magne-

sium content, is accompanied by low blood magnesium values, the use of magnesium supplements such as dolomite appear to be justified. In this country, the condition appears to be localized in several areas and to be complicated by the nitrogen and potassium contents of the forage; generalized recommendations can not be made at this time.

Muscular dystrophy, stiff lamb disease, encephalomalacia, and exudative diathesis have all, in the past, been associated with a deficiency of vitamin E. It now appears that a deficiency of selenium might be responsible for exudative diathesis¹¹ in fowl and closely associated with stiff lamb disease.¹⁶ Ewes fed hays containing less than 0.1 p.p.m. of selenium produced almost 100% dystrophic lambs, whereas those given supplemental selenium as sodium selenite were normal. Both vitamin E and selenium have been effective in some experiments.^{16,18} Of particular interest to the veterinarian is the discovery by Australian workers¹³ that the subcutaneous injection of 1 mg. of sodium selenite every 7 to 10 days results in protection of lambs from muscular dystrophy with a significant increase in growth rate. Increased growth rates were also obtained by such treatment in lambs from areas where stiff lamb disease was rare.

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Relationship of Iron-Dextran Injections to Neoplasia

Although the iron-dextran complex has been widely used in human medicine for 6 years, evidence that it has caused neoplasms in man is limited to a single report of a sarcoma which developed in the deltoid muscle at a site where the drug was thought to have been injected 3 years previously. The initial diagnosis of sarcoma was considered questionable.

Although the drug has been shown to induce sarcoma in mice and rats, attempts to produce similar lesions in rabbits and guinea pigs have failed. In evaluating the significance of the changes in rats, it should be remembered that this species is especially susceptible to development of local sarcomas after intramuscular injection of a variety of substances not causing malignancies in other animals.—*J.Am.M.A.*, 175, (Feb. 4, 1961): 388.

Enzymes in Ruminant Feeds

The status of enzymes for ruminants can only be described as confused, chaotic, commercialized, and complex. First of all, no research to date clearly explains why enzymes appear to function in rumen metabolism, nor does it account for differences in experimental results with varied rations.

With certain minor exceptions, most enzymes have not performed spectacularly well in ruminant rations. The gains have been improved only relatively little and feed efficiency has been bettered sporadically. Because of the increased cost of enzyme addition, enzymes have not increased financial returns to the feeder in most trials.—*S. H. Morrison, 3rd Midwest Vet. Nutr. Conf., Kansas City, Mo. (Dec. 12-13, 1960): 26.*

Use of Plastic Tube Drain in Treatment of Empyema in a Cat

R. L. Leighton, V.M.D., and Joseph T. Cordell, V.M.D.

THE OCCURRENCE of empyema in the cat is not uncommon and may result from pneumonitis, mouth infections, bite wounds, or an unknown source. Treatment is often difficult, and satisfactory recovery is rare. Corrective measures consist of repeated thoracentesis to drain off pus, intrapleural instillation of antibiotics and proteolytic enzymes, administration of systemic antibiotics, fluid management, oxygen therapy, special diets, and adequate vitamins.

The purpose of this report is to describe the use of a plastic tube drain in the thorax¹ which aided in providing an easy means of repeated draining and medicating that was lifesaving.

Case History

On June 3, 1960, a male cat 5 years old was brought for medical attention with a history of anorexia for 3 days and progressive listlessness and inspiratory dyspnea.

Body temperature was 97 F. and some cyanosis was present. The heart beat was imperceptible and the cat was too weak to stand. On auscultation, decreased lung volume was discovered. Examination of a lateral radiograph revealed fluid filling the chest, and an anteroposterior radiograph revealed the left side to be more affected.

Immediate thoracentesis with removal of 200 cc. of fluid using an 18-gauge needle produced rapid improvement. Increased lung space was visible in a radiograph.

A low white blood cell count of 6,750 was attributed to exhaustion of the bone marrow.

From the Animal Medical Center, New York, N.Y., where Dr. Leighton is head of surgical service and Dr. Cordell is senior staff member.

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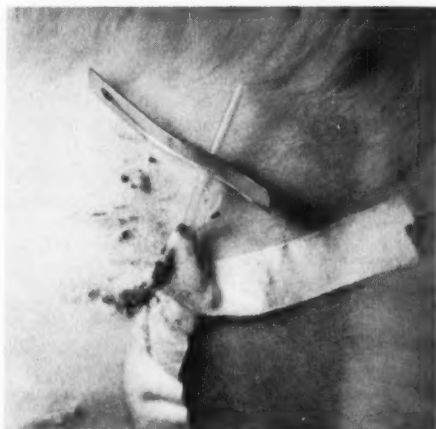


Fig. 1—The method of closure is visible in this close-up of a plastic tube in thorax of a cat.

The fluid was sanguinopurulent. On bacteriologic examination, a *Staphylococcus* was found which was sensitive to chloramphenicol, novobiocin, and nitrofurantoin. Potassium penicillin G, 200,000 units, and neomycin sulfate, 200 mg., in 3 cc. of 0.9% saline solution were instilled intrathoracically, and 150,000 units of penicillin was given intramuscularly. Anti-feline distemper (panleukopenia) serum, 5 cc., was given. This protection is given all cats brought into the hospital. The next day the same medication was given plus 150 cc. of 0.9% saline and 5.0% dextrose solution and 1 cc. of a multivitamin preparation subcutaneously.

Body temperature rose to 103.8 F., decreased to 102.6 F. on the 6th day, then returned to normal. On the 6th day, 80 cc. of fluid was removed from the chest. The next day the tube was placed in the chest. By the 14th day, no fluid could be with-

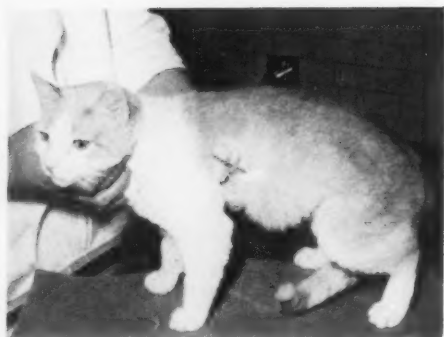


Fig. 2—Cat with plastic tube in place. It tolerated this arrangement well.

drawn; on the 18th day, the lungs were clear on radiography and the tube was removed. The cat was discharged on the 21st day completely recovered. It was reported doing well 6 months later.

Technique of Implanting Plastic Tube

Intravenously, 10 mg. of chlorpromazine was given to this cat which was large and active. An area was shaved over the left thoracic wall and a spot in the skin was

infiltrated with procaine. A nick in the skin was made ventral to the area selected for introducing the tube. The skin was moved dorsad, and a trocar and cannula introduced in the 9th intercostal space. All pleural fluid was aspirated. A short length of small-gauge polyethylene tubing previously soaked with benzalkonium chloride was inserted through the cannula which was then removed. Fluid was withdrawn by suction on the tube with a syringe. Closure of the tube was made with the clamp from a fluid infusion set (Fig. 1). The cat tolerated this arrangement well (Fig. 2). A jacket of stockinette was provided to cover and retain the clamp and tubing.

The cat did not seem to experience distress, and repeated daily aspirations and injections could be given easily. When no longer needed, the tube was pulled out and the skin slipped down over the hole.

Summary

Use of a plastic tube for intrathoracic drainage enabled us to carry out the requisite multiple aspirations and injections so readily and painlessly that recovery from a case of empyema in a cat was greatly aided.

Feline Microsporosis Treated with Griseofulvin and Clipping

Two cats with microsporosis were treated with griseofulvin. The smallest effective dose was 15 mg./kg. daily, which did not prevent further autoinfection in both cats.

After doses of 30 mg./kg. daily were given, the bases of all hairs remained free of *Microsporum* infection. The tips of some hairs remained infective. After clipping the cats, no new infection was observed in subsequent months.—*Kleintier-Praxis*, 6, (Jan., 1961): 22 (German).

Effects of Dithiazinine Iodide on *Dirofilaria immitis* in Dogs

Neil F. Chapman, D.V.M., and Alvin W. Smith, D.V.M.

A SENTRY DOG program was initiated in the Pacific Air Forces in 1952. Since this time there have been 412 deaths, 121 of which have been attributed to *Dirofilaria immitis* infection and its treatment. Because of the vicious, aggressive nature of the sentry dog, perivascular administration of arsenical compounds has sometimes occurred. The resulting sloughs and arsenical dermatitides have necessitated euthanasia of 6 dogs.

For 2 years, the procedure of treating every sentry dog in the Pacific Air Forces annually with 0.75 mg. of arsenic per kilogram of body weight intravenously for 2 consecutive days as a therapeutic and prophylactic measure was practiced to prevent the occurrence of heavy heartworm infections.¹ This method has provided relatively effective control of *D. immitis*; however, blood tests revealed that 51.25% of the Pacific Air Forces sentry dogs had *D. immitis* infection in 1959. Therefore, somewhat less than 48.75% of the sentry dogs were not infected and were being subjected to arsenical therapy unnecessarily.

The following project was carried out to determine if dithiazinine iodide,* a low toxicity drug free of undesirable side reactions and administration problems, could effectively and safely destroy the adult stages and microfilariae of *D. immitis*.

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These experiments were conducted according to the "Rules Regarding Animal Care" established by the American Medical Association.

The contents of this report reflect the personal views of the authors and are not to be construed as a statement of official Air Force policy.

The authors thank Captain R. P. Hudson, Jr., M.C., U.S.A.F., for histopathologic studies, and Mr. T. Ono for his laboratory assistance.

*Dizan, Corn States Laboratories, Inc., Omaha, Neb.

Material and Methods

Dithiazinine iodide was available in both tablet form and as a powder. Because some dogs were reluctant to eat the powdered form in their food, only tablets given *per os* were used in this project. Tablets used were in 50, 100, and 200 mg. sizes.

Mixed-breed dogs infected with *D. immitis* were obtained from Tokyo municipal dog pound. The experiments were carried on over an 18-month period by subjecting various groups of dogs to a variety of different dosages. After preliminary studies were conducted on mixed-breed dogs, various doses considered to be in the "safe range" were given to government-owned German Shepherd Dogs. Data was obtained on 145.

After it became evident that dithiazinine iodide was not satisfactory for eliminating adult *D. immitis* (Table 1), experiments were set up to test its effectiveness in eliminating the microfilariae of *D. immitis*. A parenteral arsenical** was given intravenously in a dosage of 0.75 mg. of arsenic per kilogram of body weight for 2 consecutive days to kill adult *D. immitis*. Dithiazinine iodide was administered 15 days after arsenical therapy (Table 2).

Results are summarized in Tables 1 and 2.

Discussion

Occasionally a dog remained positive or became negative and then positive again for microfilariae following the course of treatment with the arsenical and dithiazinine iodide even when the latter was given in dosages far exceeding the minimum effective dosage. This was sometimes due to the fact that some dogs vomited diathiazinine iodide. Because this arsenical did not kill all adult worms, it seemed that dogs which did not vomit dithiazinine iodide but still harbored microfilariae might have live adults. Necropsy examination verified this theory. Dogs positive for microfilariae and

**Filicide, sodium p-bis (carboxymethylmercapto) arsenobenzenamide, Pitman-Moore Co., Indianapolis, Ind.

TABLE 1—The Effect of Dithiazinine Iodide on Adult *Dirofilaria immitis*

No. dogs	Dosage of dithiazinine in mg./lb. body weight	Dead <i>D. immitis</i> (%)	Remarks
10	10 mg. per day for 10 days.	29	All dogs were necropsied 14 days after initial dithiazinine iodide dosage. All had live <i>D. immitis</i> in right side of the heart and pulmonary arteries.
8	20 to 100 mg. per day for 4 to 10 days.	17	Seven dogs died in 4 to 10 days. One dog was killed on the 10th day after it was given 100 mg. dithiazinine iodide per pound of body weight per day for 10 days. All 8 dogs contained live adult <i>D. immitis</i> .

treated with dithiazinine iodide, alone, became negative and then positive again after a variable length of time. Apparently, dithiazinine iodide did not alter fertility of adult worms.

Thirteen dogs in one group were each treated with 50 mg. of dithiazinine iodide per pound of body weight for 2 days in November. Four dogs were positive for microfilariae but were considered free of adults because of previous administration of arsenicals. Sixty days later, in January,

all dogs were negative for microfilariae. This is further evidence that all dogs were free of adults at the time dithiazinine iodide was administered. Ninety days later, in April, 6 dogs were positive for microfilariae. Three had been negative when dithiazinine iodide was given in November, and 3 had been positive at that time. This may indicate that dithiazinine iodide is not effective against migratory larvae and immature *D. immitis*; however, more work is needed to verify this.

TABLE 2—Effect of Dithiazinine Iodide in Various Dosage Ranges on Microfilariae of *Dirofilaria immitis*

No. of dogs	Dosage of dithiazinine iodide in mg./lb. body weight	Arsenic 0.75 mg./kg. i.v. for 2 days	No. dogs negative for microfilariae at various intervals following initial treatment					Remarks
			No. days					
			5	10	20	30	60	
4	100 mg. for 2 days	....	4	4	....	3	....	Effective for rapid removal of microfilariae.
3	100 mg. for 1 day.	given 15 days prior to dithiazinine iodide	....	2	3	2	2	At necropsy the dog which was positive on the 30- and 60-day blood tests had live adults.
52	10 mg. for 10 days.	....	....	51	51	....	....	One dog remained positive; it may have vomited the drug or had live adults. Dosage was effective, but treatment schedule was prolonged. All were German Shepherd Dogs. Dogs 1 to 3 years old lost an average of ¼ lb. each. Dogs 7 to 10 years old lost an average of 9 lb. each.
10	50 mg. for 2 days.	....	....	10	....	....	....	Effective dosage. Tolerated well by dogs on 2 parts dry meal to 1 part horsemeat.
6	50 mg. for 2 days.	....	3	6	....	0	....	Effective against microfilariae. By 30 days, adults had reproduced microfilariae in all dogs.
19	50 mg. for 1 day.	Given 15 days prior to dithiazinine iodide.	....	16	18	....	....	Vomiting of dithiazinine iodide occurred in dog remaining positive.
3	5 mg. for 10 days.	....	....	2	3	2	....	Effective dosage with prolonged treatment.
30	25 mg. for 1 day.	Given 15 days prior to dithiazinine iodide.	....	26	....	....	....	Effective dosage. Two positive dogs vomited. The 2 remaining positive dogs may have had live adults following arsenical therapy.

Sections of kidney, liver, and adrenal gland from 10 dogs given 10 mg. of dithiazinine iodide per pound of body weight for 10 days were submitted on the 10th day for histopathologic studies. In 7 of these 10, there were sharply demarked foci of fatty degeneration in a portion of the kidney tubule. The amount of damage appeared unrelated to the chronic interstitial nephritis occurring in some dogs. It was felt that something was selectively damaging a portion of the kidney tubule, such as iodide or dead microfilariae breaking up and lodging in renal capillaries and causing infarction. The latter theory appears more plausible because of the focal nature of the involvement. There was evidence of acute inflammation in the liver, and large quantities of bile pigment and bile thrombi were present. The hepatic cells themselves appeared normal. Cause of liver damage was not determined. Adrenal glands were normal. The same pathologic conditions were encountered in 4 out of 4 dogs given 5 mg. of dithiazinine iodide per pound of body weight for 10 days. One dog died of unknown causes after 6 days of treatment with 20 mg. of dithiazinine iodide per pound of body weight per day. Histopathologic lesions were not observed. Another dog treated with 40 mg. per pound per day died on the 3rd day of treatment. Previously described histopathologic lesions were found. Dogs appeared to tolerate this drug much better than histopathologic studies indicated. One dog survived a dosage of 100 mg. of dithiazinine iodide per pound of body weight per day for 10 days and was later euthanatized. In all cases, blue diarrhea was evident for the duration of drug administration. Occasionally, vomiting occurred in dogs given any dosage studied. In some cases, a temperature rise to a maximum of 104 F. and slight depression occurred 3 to 4 days following drug administration. It was not known whether these signs were due to drug intoxication or to microfilariae starting to die and break up. Dosages of 50 mg. per pound of body weight for 2 days have been used on many dogs 8 to 12 years old without severe intoxication.

A dose of 25 mg. per pound of body weight for one day was effective for freeing the blood stream of microfilariae, and that amount is considered the preferred dose by the authors.

Using the data gained from experiments

with this drug, the present Pacific Air Force Program for control of *D. immitis* in sentry dogs consists of semiannual (May and November) blood testing of all sentry dogs. All dogs positive for microfilariae are treated intravenously with an arsenical dosage of 0.75 mg. per kilogram body weight for 2 consecutive days followed by 15 days of rest in the kennel. At the end of this 15-day period, 25 mg. of dithiazinine iodide per pound of body weight is given for one day provided the dog is normal. Insecticides are used as needed to keep the kennel area free of insects.

Summary and Conclusions

- 1) Dithiazinine iodide does not effectively eliminate adult *Dirofilaria immitis* from dogs.
- 2) It has an excellent microfilaricidal effect in dosages as low as 25 mg. per pound of body weight for one day.
- 3) Dithiazinine iodide does not affect fertility of adult *D. immitis*. It appears ineffective against migrating larvae and immature *D. immitis*.
- 4) Intoxication does not appear to be an important factor when 25 mg. per pound of body weight are given for one day.
- 5) Semiannual blood testing, treating dogs for adult *D. immitis* infection with arsenicals, treating dogs for microfilarial infection with dithiazinine iodide, and an effective mosquito control program constitute the present heartworm control program for sentry dogs in the Pacific Air Forces.

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Handling and Treatment of Common Exotic Mammal Pets

Werner P. Heuschele, D.V.M., and Charles P. Gandal, D.V.M.

IT IS the purpose of this report to present a few basic facts on handling and treatment of wild mammals commonly encountered as pets, based on the experience of the authors in zoo work, in the hope that practitioners confronted with such cases will feel encouraged to proceed and render a service which also is part of our professional responsibility.

The practitioner dealing with exotic pets should be able to recognize them and to know something of their natural history. Such knowledge is helpful in advising clients on care and feeding.^{1,7,13}

The practitioner should be familiar with special laws and regulations pertaining to wild animal pets. Some areas (state or city) prohibit such pets; others require permits. A valuable service can be rendered by advising a client on such regulations.

Most wild mammals have a closely related domestic counterpart in which anatomy and physiology often are similar. The approach to diagnosis and therapy should be based upon these correlations. In most instances, the laboratory diagnostic aids used in domestic species are applicable to wild species, using known normal values of the related domestic species as a basis for evaluation of findings. Body temperature as a diagnostic aid should not be relied upon too heavily since wild animals are usually excitable and, hence, normal temperature readings are seldom obtained.

Wild mammals are subject to essentially the same disease problems as their domestic counterparts. Generally therapy should follow basic principles, regardless of the type of animal.

A few drugs are contraindicated in some

species, e.g., tranquilizers other than promazine and metaminodiazapoxide* should not be used in equine species. Procaine penicillin is frequently toxic to wild birds and guinea pigs.

The greatest problems confronting most practitioners in dealing with exotic mammals are restraint and anesthesia. In most cases, gentle, limited restraint is preferable in examining and treating such pets, since "psychogenic shock" is often a problem. However, the "tame" wild animal frequently is docile only in the hands of its owner and may become frightened and vicious when approached by a stranger.

The tranquilizing drugs, although not always successful, have proved to be a valuable aid in handling wild animal pets, often reducing their fears and viciousness and minimizing the danger to the examiner.

Primates

Members of this group include marmosets, squirrel monkeys, monkeys, and anthropoid apes. Most have physiologic and anatomic similarities to man. Among the commonest diseases encountered are respiratory diseases, including the common cold, influenza, bronchitis, and pneumonitis.

Tuberculosis (human type) also occurs frequently. Testing for this disease is advisable at least once a year. The technique requires intradermal administration of 0.1 cc. of a 1:20 dilution of OT (old tuberculin) in the upper eyelid¹⁴ (Fig. 1). Test results should be observed at 24- 48- and 72-hour intervals. A positive reaction is indicated by swelling of the eyelid and usually complete closure of the eye (Fig. 2). Intermediate strength PPD (purified protein derivative) may be used in place of OT.

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Presented before the Combined Sections on Small Animals, General Practice, and Surgery and Obstetrics, 96th Annual Meeting of the American Veterinary Medical Association, Kansas City, Mo., Aug. 23-27, 1959.

*Metaminodiazapoxide, Lebrum, is produced by Hoffmann-LaRoche, Inc., Nutley, N.J.

Diarrhea and dysentery due to *Salmonella* and *Shigella* organisms occur frequently. Intestinal protozoa such as *Endamoeba histolytica* and *Balantidium coli* are often seen in stools of apparently healthy primates but are occasionally associated with severe diarrhea. An arsenical, such as p-carbamino phenyl-arsonic acid,^{*} has been used successfully in the treatment of this latter condition. Diiodohydroxyquin** in combination with paromomycin sulfate† has also been effective.

Strongyloides species, hookworms, whipworms, nodular worms, pinworms, and ascarids are common in monkeys and apes. Piperazine compounds provide safe and highly efficacious therapy for ascarids and pinworms but are apparently ineffective against other nematodes. Dithiazanine iodide is reported to be effective against the remaining listed nematodes.¹⁵ Tetrachloroethylene and hexylresorcinol are also suggested.¹²

Dietary requirements of most primates are similar to those for man. Inadequate diets leading to deficiency diseases such as rickets, scurvy, and beriberi are not uncommon. An evaluation of the diet should always be made and included in the history of any ailing primate. It is essential that balanced mineral and vitamin supplements be provided.

Normal physiologic values (such as hematologic data and blood and urine chemistry) in most primates are sufficiently close to human values to be reliable as diagnostic aids. Since most primates have a liking for sweet foods, flavored vehicles employed by the pediatrician for oral medication of children are valuable and greatly facilitate drug administration. Where there is satisfactory acceptance of a medication prepared in the above manner, the oral route is preferred to parenteral drug administration since the former method requires little or no handling of a nervous patient—an important consideration. Standard dosages of drugs as recommended by the manufacturer for man should be employed in proportion to weight in most primates. The pediatrician may prove a valuable consultant when dealing with primate patients.

When restraint of a small primate is necessary, a relatively simple method is to



Fig. 1—The technique of administration of intradermal tuberculin into the upper eyelid of a monkey.

grasp both of the animal's arms just above the elbows from behind, drawing the animal's arms back so that its elbows almost touch behind the back (Fig. 3). In a small animal, one hand may be sufficient to hold both arms back in this manner, leaving the other hand free to hold both legs out-

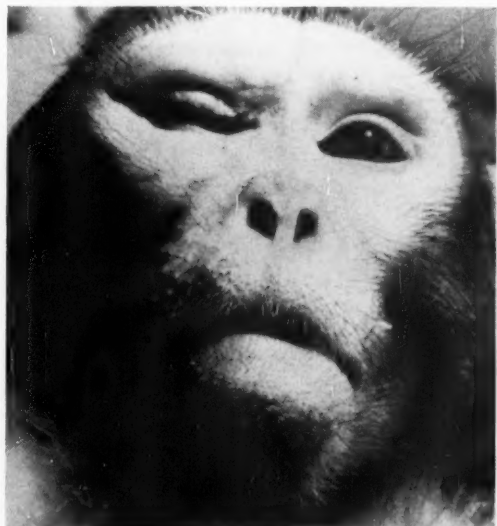


Fig. 2—A positive reaction to tuberculin 48 hours after administration in the right upper eyelid of the monkey. There is edema of eyelid and surrounding tissue.

*Carbarsone, Eli Lilly and Co., Indianapolis, Ind.

**Diodoquin, G. D. Searle and Co., Chicago, Ill.

†Humatin, Parke, Davis and Co., Detroit, Mich.

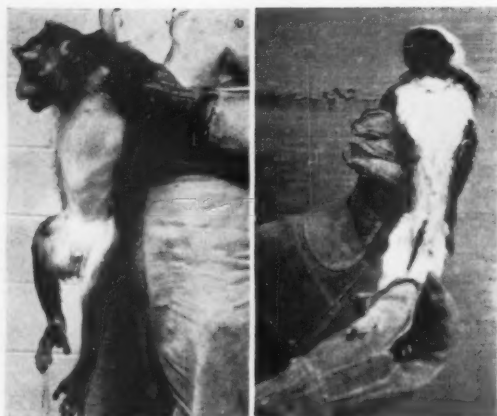


Fig. 3 (left)—A simple and safe means of restraining monkeys is provided by grasping both of the animal's arms just above the elbows and holding them behind its back.

Fig. 4 (right)—Technique of restraining small primates (in this case a cotton-top marmoset). Leather gloves prevent bite injury to operator while making initial capture of animals.

stretched (Fig. 4). Two attendants may also hold the animal in a "spread-eagle" fashion to facilitate venipuncture. It is advisable for the handler to wear leather animal-handling gloves when restraining the patient, to reduce chances of being bitten.

Venipuncture can be most easily accomplished in most primates by using the decubital or femoral veins.

Several means are available to produce anesthesia in primates, depending on size and tractability of the patient. In small animals such as the marmoset or squirrel monkey, or wild larger monkeys which are difficult to restrain, the "ether box" is satisfactory (Fig. 5). Intraperitoneal injection of sodium pentobarbital at a dose of 13 mg. per pound of body weight (1 gr./5 lb.) may also be employed with good reliability in most primates. Intravenous injections may be given by restraining the animal in a squeeze-cage (Fig. 6).

Information on the care of monkeys as pets and on diseases of primates has been published.^{6,12}

Carnivores

Wild carnivores most commonly encountered by practitioners can be divided into the following families: Felidae, Cani-

dae, Mustelidae, Procyonidae, and Ursidae.

Felidae (Ocelot, Cheetah, Margay, Puma, Bobcat).—Wild cats show great similarity to their domestic counterparts with respect to disease susceptibilities and nutritional requirements. Immunization against feline infectious enteritis (panleukopenia) is imperative and should be instituted at 3 months of age. Annual vaccination using a dosage of killed-virus vaccine in proportion to weight (1 dose per 25 to 50 lb. of body weight) is recommended. Feline pneumonitis vaccination is also recommended.

With a fractious or vicious animal, restraint in a squeeze-cage or net and use of intramuscular tranquilizers facilitate examination or treatment.

Care must be observed when anesthetizing wild cats since there is great individual variation in sensitivity to barbiturate anesthesia. Most wild cats require less than the usual standard dose of 1 gr./5 lb. of body weight of sodium pentobarbital used in domestic cats to produce surgical anesthesia. For this reason, the intravenous route of administration, to effect, is preferred over giving a calculated dose intraperitoneally.

In a large cat such as a puma or cheetah, the caudal veins situated on each side of the tail are often the most convenient sites for venipuncture, although they may be difficult to locate in obese animals. Use of this site exposes the operator to the least danger. Meperidine and promazine have been employed as preanesthetic medications for barbiturate anesthesia in ocelots and leopards with good results.²

Canidae (Wolf, Coyote, Fox, Dingo).—Like their domestic counterparts, members of this group are susceptible to canine distemper, infectious hepatitis, rabies, and other infectious canine diseases. Immunizations and treatment for these diseases should be given on the same basis as in domestic dogs. Restraint techniques used on vicious or intractable dogs are applicable here. A small squeeze-cage is of great benefit.

Mustelidae (Skunk, Weasel, Mink, Ferret, Badger).—Members of this group are more similar physiologically to the domestic dog than to other domestic species, and are susceptible to canine distemper and rabies. Modified live-virus vaccines for rabies or canine distemper intended for use in dogs must not be used in mustelids, since the virus in these vaccines is still

sufficiently active to produce disease in this group of animals. For rabies immunization, the killed-virus vaccine is preferred. For canine distemper immunization, a killed-virus vaccine should be given annually.

The mink is reported to be susceptible to feline infectious enteritis and immunization is recommended.^{17,18}

It is wise to wear leather animal-handling gloves when dealing with members of this group since bare-handed restraint adequate to prevent being bitten is difficult. Anesthesia is facilitated by careful use of an ether box, or intraperitoneal sodium pentobarbital at a dose of 1 gr./5 lb. body weight. Ordinarily, venipuncture is difficult in this group.

Procyonidae (Raccoon, Kinkajou, Cacomistl—Ring-Tailed Cat).—The raccoon is reported to be susceptible to both canine distemper and feline infectious enteritis. Immunization against these diseases is, therefore, recommended. A killed-virus type of canine distemper vaccine is preferred, since experimental data on the use of modified live-virus vaccines in this species are not available. Like the mustelids, members of this group are most similar physiologically to the dog.

Restraint and anesthetization techniques for this group are similar to those used with mustelids.

Ursidae—Bear.—Bears are subject to ailments similar to those occurring in dogs. Bears, however, are reportedly not susceptible to either canine distemper or feline infectious enteritis.³

Pentobarbital sodium, 1 gr./5 lb. of body weight given intravenously or intraperitoneally, is the preferred anesthetizing technique.

Intestinal nematodes and tapeworms are frequently found in all species of carnivores. Ascarids are most common. Piperazine compounds and diethylcarbamazine* have been most efficacious in the treatment of these latter parasites. Tapeworms are commonly treated with quinacrine hydrochloride.

Hoofed Animals

Occasionally a practitioner may treat pet deer. Physiologically, deer are comparable to sheep. Disease problems should be

*Caricide, American Cyanamid Co., New York, N.Y.



Fig. 5—The "ether box" provides a convenient means of administering ether anesthesia to animals which are difficult to restrain. Sides and bottom are solid wood, sliding top includes glass panel which permits observation of the patient. Ether is poured on wad of cotton placed in cage prior to placement of patient.

handled in a manner similar to those used in sheep. The use of a gun for administering medications, tranquilizers, and immobilization agents to deer from a distance has greatly facilitated handling and treatment. Succinylcholine hydrochloride or nicotine

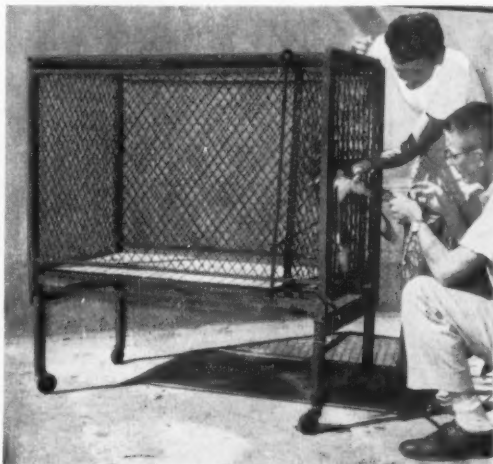


Fig. 6—The squeeze-cage provides safe, convenient restraint and permits the administration of parenteral injections.

alkaloids are the immobilizing drugs commonly employed.^{3,4,10,19}

Rodents

Squirrels, guinea pigs, hamsters, rats, mice, chipmunks, and chinchillas are often kept as pets. A frequent problem is overgrowth of incisor teeth due to improper wear or poor apposition. Bone cutting forceps or saws are employed to cut teeth to the proper length. Leather animal-handling gloves should be used when larger members of this group are restrained. Excellent reports on the nutritional requirements and diseases of laboratory rodents have been published.¹¹

Summary

Techniques for restraint, anesthetization, treatment, and immunization of exotic wild animals commonly encountered as pets are presented. Most wild animals kept as pets have a domestic counterpart and diseases in each group are similar and should be approached in the same manner as in treating its domestic equivalent. The primates (monkeys and apes) have anatomic and physiologic similarity to man, and diagnosis and therapy should be approached with this fact in mind. References pertinent to wild animal pets are listed.

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Persistence of Tetracyclines in Bone

Tetracycline and chlortetracycline persisted in bones of rats for a long time after oral, intravenous, or intraperitoneal administration. Specific fluorescence was present in the whole skeleton 16 weeks after a single intraperitoneal injection of 250 mg./kg. of tetracycline. Rats given feed containing 0.01% of chlortetracycline for 2 years acquired concentrations of 19 to 35 μ g./Gm. of bone, whereas those fed 0.2% had 240 to 250 μ g./Gm. of bone.—*Vet. Bull.*, 31, (March, 1961): 161.

How to File Information—and Find It

Moshe Shifrine, Ph.D., and D. A. McMartin, B.V.M.S., M.R.C.V.S.

REVIEWING and keeping track of only the relevant fraction of the shower of scientific literature is a great burden on the average research worker. Indispensable to his task is the filing and cross-referencing of information in a systematic and readily available form. A recent publication,¹ emphasizing the need for help in establishing such a system, leads us to describe a system we have used for several years, modified to serve both research worker and practitioner.

Information is recorded on punch cards of a generally familiar type—those that are separated when a needle inserted in a selected hole is used to lift out the cards not wanted. These cards are available in a variety of sizes; our preference is the 3-by 5-inch card because it readily fits the pocket. This card has 51 peripheral holes. The digits directly under the holes represent their numerical value. Below these digits are the numbers of the holes, from 1 to 51. The two should not be confused.

Two methods of classification are in common use: (1) a direct method, in which each hole on the card represents one subject; and (2) an indirect method, in which a section of 4 holes (e.g., holes 1, 2, 3, and 4 in Fig. 1) can be used singly or in combination to obtain any number from 1 to 10. In the 2nd section (e.g., holes 5, 6, 7, and 8 in Fig. 1), the values are expressed in 10's, i.e., hole No. 6 has the value of 20. In our example, to get 77, one notches hole No. 4 (the digit under this hole is 7) and No. 8 (the 7 under this hole represents 70).

Following is a description of a possible model which can be adapted to the needs of the individual. These categories repre-

sent the 51 numbered holes on the 3- by 5-inch punch card.

	1-8—Authors
	9—Bacteria
	10—Fungi
	11—Viruses
	12—Protozoa
	13—Other parasites
	14-17—As needed
RESEARCH WORKER	PRACTITIONER
18—Morphology	Anatomy
19—Metabolism	Nutrition
20—Genetics	Genetics
21—Instrumentation	Instrumentation
22—Enzymes	Therapeutics
23—Methods	Techniques
24—Taxonomy	Etiology
25—General (any other subject)	General (any other subject)
26—As needed	As needed
27-34—Specific subject	Specific disease (indirect method)
	1—Erysipelas
	2—Brucellosis
	3— <i>Mycoplasma gallisepticum</i> infection
	4-100—As needed
35-39—Bacterial species	Animal Species (indirect method)
	1—Swine
	2—Poultry
	3—Cat
	4-11—As needed
40-43—As needed	As needed
44-51—As needed	Systematic pathology (indirect method)
	1—Respiratory
	2—Urogenital
	3—Digestive
	4-100—As needed

"Authors" includes writers of scientific papers, names of drug firms, instrument makers, and others. In the indirect method, the numerical-alphabetical code (Table 1) derived from *Chemical Abstracts* is used for identification of authors.

This system enables a scientific paper to be cross-referenced under several different headings, permitting quick location of any

From the School of Veterinary Medicine, University of California, Davis.

¹Wolff, A.: A Card Reference File for the Practitioner's Library. J.A.V.M.A., 137, (Dec. 15, 1960): 722.

Fig. 1—Example of indirect method of classification. Notched holes numbered 4 and 8 represent 77.

TABLE 1—Numerical-Alphabetical Distribution as Used in the Indirect Method

1 A—	26 Fal—	51 Ku—	76 Ros—
2 Alc—	27 Fin—	52 Lam—	77 Rum—
3 Andr—	28 Form—	53 Leb—	78 San—
4 Ask—	29 Frie—	54 Lev—	79 Sche—
5 Bak—	30 Garn—	55 Lit—	80 Scho—
6 Bart—	31 Germ—	56 Lue—	81 Scr—
7 Bei—	32 Glo—	57 Mc (Mac)	82 Shei—
8 Bert—	33 Graf—	58 Mall—	83 Sil—
9 Blak—	34 Gros—	59 Mas—	84 Smith—
10 Bond—	35 Hae—	60 Mei—	85 Som—
11 Bram—	36 Har—	61 Mid—	86 Stap—
12 Bro—	37 Hay—	62 Moe—	87 Sto—
13 Bue—	38 Hep—	63 Mot—	88 Sup—
14 Cam—	39 Hill—	64 Nad—	89 Tan—
15 Ce—	40 Holm—	65 Nev—	90 Thi—
16 Chi—	41 Hue—	66 Nos—	91 Top—
17 Cod—	42 Igf—	67 Oll—	92 Tw—
18 Cor—	43 Ind—	68 Pal—	93 Van D—
19 Cur—	44 Jae—	69 Pca—	94 Vir—Vir—
20 Day—	45 Jon—	70 Ph—	95 Wall—
21 Dev—	46 Kap—	71 Pol—	96 Weig—
22 Doo—	47 Kem—	72 Pro—	97 White—
23 Dun—	48 Kis—	73 Ran—	98 Win—
24 Edw—	49 Kod—	74 Rel—	99 Wri—
25 Eng—	50 Kot—	75 Rip—	100 Z—

card. For example, "Immunization against *Mycoplasma* Infections in Poultry," by Adler *et al.* (*Am. J. Vet. Res.*, 21, (1960): 482) can be indexed as follows:

Author: Adler, in Fig. 2 is No. 1; hole 1 is notched.
 Mycoplasma: Under "Bacteria," hole 9 is notched.
 Vaccination: Under "Therapeutics," hole 22 is notched.
 Poultry: Under "Animal Species," No. 2, hole 36 is notched.
 Mycoplasma Under "Specific Disease," *Mycoplasma gallisepticum* infection corresponds to No. 18 in Fig. 2; holes 27, 30, and 31 are notched.
 Mycoplasma Under "Systematic Pathology," respiratory corresponds to No. 1; hole 44 is notched.

A card so notched, with additional information printed on it, is shown (Fig. 2). Before attempting to design your own system, accumulate about 500 cards with

Fig. 2—Example of cross-filing a report.

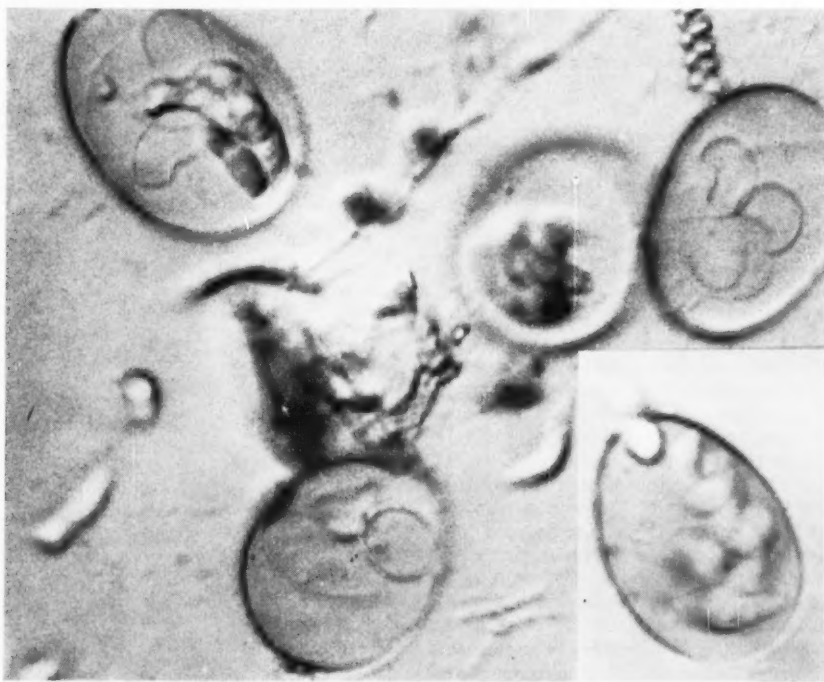
information recorded on them. Careful study of the recorded material will indicate the needs of your system and the most suitable classification. Reserve some holes for later use as new or overlooked possibilities develop.

The method here described has the following advantages: speed in both filing and retrieving information; cards do not have to be filed in any order; subjects are cross-referenced; cards can be carried conveniently.

Enzymes Studied for Coccidiosis Control

Basic research studies that explain the hatching mechanism of coccidia may pave the way for effective coccidiosis control in poultry and livestock. In these studies, hatching of coccidia was induced in the laboratory after treatment of oocysts with

enzymes with hatching action and of control outside the host by use of enzyme-like substances in sprays or other treatments to remove the protective coverings of the coccidial cysts in forage, feed, or water.



Photomicrograph of coccidia hatching after treatment with an enzyme and bile.

salivary enzymes, steapsin, and bile. This work indicates the possibility of control within the host by drugs that would inter-

To date, research on this project has been conducted primarily in sheep.—*USDA News Release, April 1, 1961.*

Editorial

About the House of Delegates

At the AVMA House of Delegates meeting just prior to the 98th Annual Meeting at Detroit, many important issues will be decided. The decisions will not satisfy everyone, perhaps least of all those who take no interest in the issues beforehand. But the House of Delegates is the legislative body of the Association and as such deserves the attention and active interest of every veterinarian concerned with the future of his profession.

How the House Works

Each constituent association is entitled to send a delegate and an alternate delegate to the House of Delegates. On some issues, these delegates will have to rely on their own good judgment, but they should have the advantage of knowing the wishes of their constituents on most issues. The voting power of the delegates is proportional to the number of members in the constituent association they represent.

Most of the matters dealt with at the annual meeting are in the form of resolutions which originate at local, state, or provincial levels. In addition, the House acts on reports submitted by the various AVMA Councils and by the Executive Board.

The AVMA House of Delegates functions like many other legislative bodies. The resolutions and reports are assigned to reference committees early in the meeting; thus, most of the work is done in committee sessions. Although a nondelegate member is not permitted to speak from the floor of the House, he can attend the reference committee meetings and can present his views there.

If it were possible for a great many people to propound their viewpoints or to argue their cases at the annual meeting, little business could be accomplished. So it is necessary to work through a system that insures some degree of efficiency and provides for elected representatives.

The members who have a special interest in a matter worthy of action at the national level and of concern to a large number of veterinarians can most effectively

be heard by proposing a resolution to be forwarded from their constituent association to the AVMA House of Delegates. At the Denver convention, 25 such resolutions were acted upon.

There is no reason why a member should not send a letter of opinion to his delegate, whether or not it concerns a particular resolution. Delegates appreciate, should even seek, the opinions of their constituents.

Some of the Issues

Among many other items to come before the House at Detroit are resolutions, proposals, or reports pertaining to: changing the AVMA symbol (the caduceus), the question of specialty boards and specialty groups, adequacy of USDA-AIQ facilities, the national hog cholera eradication program, restricting use of dangerous drugs, change in voting strength of the delegates, establishing a new section on regulatory veterinary medicine, and requiring AVMA members to maintain membership in a constituent association.

Now Is the Time

During the summer months, many constituent associations will hold meetings at which AVMA delegates will be elected or instructed or both. Whether the delegate is one who is vitally interested in the work of the House or whether he is one who customarily fills the position regardless of interest is a matter for his constituents to decide. At any rate, the time is at hand when you, an AVMA member, should make sure that your delegate knows what to do.

Propose resolutions in your local or constituent association, and make your views known to your delegates as well as to your executive board representative. Then go to the convention and attend reference committee meetings if you have a special interest in some matter. You have a voice in the national affairs of the profession, but a whisper may go unnoticed.

Seromucoid Levels in Animals

Plasma seromucoid levels were determined for normal horses, cattle, swine, sheep, and goats. This plasma glycoprotein fraction was expressed in terms of both its protein and protein-bound sialic acid content. A partial chemical analysis of the composition of the plasma seromucoid fraction in the horse, cow, pig, sheep, and goat was made. Plasma from hospitalized animals with various inflammatory and degenerative changes was found to have increased sero-

mucoïd levels. Marked elevations of seromucoid occurred in the bovine and ovine plasma and appeared to parallel the degree of tissue inflammation or destruction, or both. Plasma seromucoid levels were also determined in various exotic animals caged at the San Diego Zoo.—[C. E. Cornelius, E. A. Rhode, and J. A. Bishop: *Seromucoid Levels in Normal and Hospitalized Domestic and Exotic Animal Species*. *Am. J. Vet. Res.*, 21, (Nov., 1960): 1095-1100.]

Vaccination of Sheep with Irradiated Larvae of *Haemonchus contortus*

A vaccine was prepared by subjecting infective larvae of *Haemonchus contortus* to 40,000 r of x-irradiation. When 2 doses of vaccine (each containing 10,000 larvae) were given to lambs, a degree of immunity sufficient to withstand a challenge with 50,000 normal larvae was produced.—[W. F.

H. Jarrett, F. W. Jennings, W. I. M. McIntyre, W. Mulligan, and N. C. C. Sharp: *Studies on Immunity to *Haemonchus contortus* Infection—Double Vaccination of Sheep with Irradiated Larvae*. *Am. J. Vet. Res.*, 22, (March, 1961): 186-188.]

Pathology of Sheep with Vibriosis

Two experiments were conducted to determine gross and microscopic lesions of fetal membranes of sheep affected with vibriosis. In experiment 1, 14 sheep were inoculated intravenously with pathogenic *Vibrio fetus* at the beginning of the 5th month of gestation. Five similar sheep were not inoculated. The 19 animals were euthanatized 4 to 8 days after inoculation, and fetal membranes were obtained for study. In experiment 2, 36 fetal membranes were obtained from ewes which aborted from vibriosis, and changes in the membranes of these naturally infected animals were compared with the changes resulting from experimental vibriosis.

Changes in the fetal membranes due to experimental and spontaneous vibriosis were similar. In advanced stages of the disease, the uterus was edematous, especially

at the lesser curvature of the horn. Placentomes were swollen, and the chorion contained many foci of edema. Infected cotyledons separated easily from caruncles. The cotyledons were placed abnormally.

Histopathologic changes were concentrated in the hilar zone of placentomes. Septums had arteriolitis and some thrombosis. Bacteria was abundant in hematomas of the lacunes. In advanced stages of the disease, colonies of *V. fetus* were found in the cytoplasm of many chorionic epithelial cells and in the endothelium and lumens of adjacent chorionic capillaries. Chorionic epithelium of the villi desquamated into the space between septums and villi.—[R. Jensen, V. A. Miller, and J. A. Molello: *Placental Pathology of Sheep with Vibriosis*. *Am. J. Vet. Res.*, 22, (March, 1961): 169-185.]

Exsanguination of Chickens by Catheterization

A method of exsanguinating chickens was developed for 2 purposes: (1) to obtain blood samples uncontaminated by tissue juices and (2) to obtain the maximum amount of blood from a single chicken. A polyethylene tube was inserted into the brachial vein and advanced to the vicinity

of the heart. Blood was collected in a test tube connected to an aspirator. The total amount of blood obtained from a 2-kg. White Leghorn chicken was 110 to 125 ml.—[A. A. Hirata: *Exsanguination of Chickens by Catheterization*. *Am. J. Vet. Res.*, 22, (Jan., 1961): 158-159.]

Etiology of Legume Bloat

Aqueous extracts and expressed juices of forage plants caused marked evolution of gas when added to samples of bovine ruminal contents in Warburg vessels. Gas production was greater with addenda prepared from alfalfa than with corresponding addenda prepared from bluegrass. Chemical studies

of these forage preparations indicated that 40 to 60% of their gas-producing activity was attributable to 3 carboxylic acids: citric, malonic, and succinic acids.—[W. G. Rosen, H. Fassel, R. E. Nichols: *The Etiology of Legume Bloat—Nonvolatile Acids*. *Am. J. Vet. Res.*, 22, (Jan., 1961): 117-122.]

Morphology and Respiration of *Anaplasma marginale*

A study by phase contrast microscopy of the lysed erythrocytes of calves infected with anaplasmosis revealed the consistent presence of intracellular structures more complex than the marginal bodies found in stained blood films. These structures had spherical parts, 0.5 to 1.5 μ in diameter, attached to broad flat tail-like appendages 1.3 to 3.5 μ in length. Dumbbell shaped forms were also found. These structures were never seen in normal control calves. The phase contrast examination seems to offer an alternative method for diagnosis of anaplasmosis.

Comparison of the respiratory rate of erythrocytes from calves infected with ana-

plasmosis with that of erythrocytes from normal calves indicated that the mean rate of O₂ consumption of infected blood was approximately twice that of normal blood. However, the O₂ consumption attributable to the *Anaplasma* present was very low, about 2.07 cmm. per 10⁹ *Anaplasma*. For parasitic protozoa, comparable values reported range from 80 to 2,150 cmm. per hour. Thus, from the standpoint of oxidative metabolism, the *Anaplasma* do not seem to resemble the protozoa.—[K. S. Pilcher, W. G. Wu, and O. H. Muth: *Studies on the Morphology and Respiration of Anaplasma marginale*. *Am. J. Vet. Res.*, 22, (March, 1961): 298-307.]

New Books

Care of the Dog

For the client who needs a general guide book on dogs, this one has much to offer. Chapters on the general nature of the dog, nutrition and feeding, care of pups, adult care, first aid and home nursing, sex and mating, pregnancy and weaning, and aged dogs contain information that almost any dog owner will find valuable. Sections dealing with treatments of dog diseases and vaccinations are reasonably complete, gen-

erally accurate, and written well enough to be easily understood by the average lay reader. The section dealing with veterinarians is well done and views them in proper perspective. Generally, the book is well written and current.—[*Care of the Dog*. By Charles Leedham. 243 pages; illustrated. Charles Scribner's Sons, New York, N.Y. 1961. Price \$4.95.]

AAHA Holds 28th Annual Meeting

Highlight of the 28th annual meeting of the American Animal Hospital Association was the transatlantic telephone conference between veterinarians in St. Louis, Mo., and London, England.

The conference on orthopedics was the first of its kind to be held between 2 groups of veterinarians separated by 6,000 miles. The AAHA conventioners were linked by a telephone hookup with conventioners attending the annual meeting of the British Small Animal Veterinary Association.

Discussions between the 8 panelists participating, 4 in London and 4 in St. Louis, were amplified over loud-speakers for all in attendance to hear. Duplicate slides and movies were shown simultaneously to each group so that everyone could follow closely the subject matter under discussion.

Panelists in St. Louis were: Drs. Wade O. Brinker (KSU '39), East Lansing, Mich., moderator; Wayne H. Riser (ISU '32), Kensington, Md.; Gerry B. Schnelle (UP '26), Boston, Mass.; and Jacques Jenny (ZUR '42), Unionville, Pa. Panelists in London were: Drs. Gordon C. Knight, London; D. D. Lawson, Glasgow; and Halfdan Moltzen, Copenhagen, Denmark. Dr. Brian Singleton served as moderator.

Dr. William J. Magrane (TEX '43), past president of the AAHA and a former AVMA Research Fellow in ophthalmology, was invited to London to appear on



Transatlantic conference participants in St. Louis are shown beneath pictures of their British counterparts during the conference on orthopedics between the AAHA and the British Small Animal Veterinary Association.

the program of the British Congress. At the beginning of the transatlantic conference, Dr. Magrane presented a large gavel to the president of the British association from the AAHA. The gavel was named "International Bung Starter No. 1."

At the opening session of the AAHA meeting, Mr. William J. Marks, Auburn University senior veterinary student, read his award winning essay, "What Veterinary Ethics Mean to Me." Mr. Marks was the winner of the Moss Essay Contest. Essays for the contest were submitted from 9 veterinary schools; cash awards were given to 5 of the 9. The Reserve Prize, for second best essay, was won by Mr. James R. Pick, Jr., University of Georgia.

Officers installed at the meeting were: Drs. Lester R. Barto (UP '30), Basking Ridge, N.J., president; Robert P. Knowles (AUB '44), Miami, president-elect; Lee R. Phillips (COL '41), Lakewood, Colo., vice-president; and Ralph E. Ruggles (ISU '38), Moline, Ill., treasurer.

A total of 461 veterinarians from 39 states, including Hawaii, the District of Columbia, and 3 Canadian provinces, attended the convention. Total convention registration was 772.

Honors Presented at AAHA Meeting

There were 6 award winners at the AAHA meeting. They are shown on the following pages. In some cases the inscriptions on their awards are shown beside the pictures; in others, an explanation of the work performed to merit the awards is given.



Dr. J. Raymond Currey (OVC '29) accepts his award from AAHA president, Dr. Wayne H. Riser (left).

"The American Animal Hospital Association gratefully honors J. Raymond Currey, V.S., B.V.Sc., a past president, for his past and present untiring efforts in the interests of this association. His good judgment and foresight have helped guide the policies of this association in its desire to raise the prestige of the entire profession. His fine personal qualities, honorable ethics and devotion to the best interests of the small animal practitioner make him a most valued member of this association."



Dr. B. F. Hoerlein (COL '43) receives the Gaines "Fido" award from Mr. Harry Miller (left).

Dr. B. F. Hoerlein, head professor of the department of small animal surgery and medicine, School of Veterinary Medicine, Auburn University, was named by the Gaines Dog Research Center as "Veterinarian of the Year," and presented with the Gaines "Fido" award. Dr. Hoerlein's recent work has been concerned with small animal surgery, spinal conditions, intervertebral disk protrusions, and soil treatment in the control of canine hookworms. He is the author of 49 articles pertaining to these fields.



Dr. Frank E. McClelland, Sr. (COR '09) receives his award from AAHA president, Dr. Wayne H. Riser (right).

"The American Animal Hospital Association gratefully honors Frank E. McClelland, Sr., D.V.M., its second president, for his part in the early development of this association. Throughout 52 years in the profession his fine personal qualities have been cherished by the many veterinarians who have benefited by his council. His continued devotion to this association is displayed by his endless official visits to small animal hospitals in the eastern United States and Canada."

Dr. Howard Carroll (WSU '38) accepts an award for Dr. Eugene C. Jones (WSU '24), who was unable to attend the meeting. Dr. Wayne H. Riser (right) is shown presenting the award.

"The American Animal Hospital Association gratefully honors Eugene C. Jones, D.V.M., for the service he has given this association. Throughout his 37 professional years, he has shown genuine concern for the maintenance of high standards in small animal hospitals, the equipment, the personnel and the methods employed. His continued devotion to this association is displayed by his endless official visits to small animal hospitals in the western United States and Hawaii."



Dr. S. F. Scheidy (UP '29) is shown with his 1961 award from the Morris Animal Foundation. Dr. Scheidy is AVMA's immediate past president and is currently a member of the AVMA Executive Board.

"Mark L. Morris Animal Foundation Small Animal Award to S. F. Scheidy, V.M.D., for his contributions to small animal practitioners in clinical research, his contributions in teaching, and many other contributions to his profession."



Mr. William J. Marks (right), senior student at Auburn University is congratulated by Dr. Glen Lawhon, Jr. (UP '47) on winning the Moss Essay Contest.

Mr. William J. Marks was provided with an all-expense paid trip to the AAHA convention from Miami, Fla., where he is completing his student internship. Mr. Marks read his essay, "What Veterinary Ethics Mean to Me," at the opening session of the meeting.



AVMA Will Not Sponsor Pet Hospitalization Plan

The AVMA Executive Board voted to lay aside all plans for AVMA sponsorship of hospital and surgical insurance for small animals at its meeting in Chicago April 6-7, 1961.

The Executive Board's decision was based upon recommendations made in a study of the matter by AVMA's insurance consultants, Mass Insurance Coverage Administrators, Inc.

In their report, MICA pointed out to the Board that, "Every plan of insurance is, in its simplest terms, merely a method of spreading over a large number of persons a possible financial loss too serious to be conveniently borne by an individual. Individuals, in determining what risks to insure, should give first consideration to high value risks. The cost of medical care for the small animal will usually be within the means of most people. Therefore, in establishing priorities as to which risks should be insured, most people will probably not even consider health insurance for the average small animal."

"The interjection of a large-scale, successful insurance program into the field of veterinary medical care would undoubtedly cause a sharp increase in the costs of such care. Many abuses would occur," MICA pointed out. Insurance has a tendency to increase cost, they said in the report. This is true of medical care insurance—insured patients are apt to ask for more expensive, more frequent care and are prone to remain hospitalized and under the care of a physician for a longer period of time. "There is every

reason to believe that health insurance on small animals would produce similar results," they said.

MICA said that very definite standards would have to be set up for insured pets to protect such a pet hospitalization plan. Certain risks would be better than others, they said, "and probably only the very poor risks would be attracted by such a plan. It appears to us that many of the previous plans did not properly protect themselves against adverse selection . . . The cost of providing this safeguard, when related to the amount at risk, is a very disturbing factor," they said in the report.

MICA said that such things as the age, breed, general health, use of the dog (hunting, guarding, etc.), geographical location, earnings of the owner, and the psychological outlook of the owner affect the cost of veterinary medical care. All of these things would have to be taken into account when an attempt is made to set up a rate structure for a pet hospitalization plan. Such refinements in rate structure are expensive and would make a plan difficult to merchandise.

The MICA report also pointed out that if AVMA sponsored such a plan, AVMA would also have to police it to protect it against abuses.

In preparing their report, MICA contacted the American Kennel Club executive vice-president, Mr. John Neff. They said Mr. Neff was very interested and cooperative and offered to assist with research on the subject in any way practical. MICA feels that despite the problems outlined in their

report, a pet hospitalization plan could be marketed if AVMA could secure AKC co-sponsorship of the program because of the large number of dogs registered by them. However, although the AKC is interested in the plan, it is doubtful that co-sponsorship could be secured at this time.

MICA recommended to the Executive Board that for the present time further

investigation or exploration by the AVMA of pet hospitalization be dropped. However, they also recommended that AVMA keep a close watch on the demands and needs for such a program.

The action of the Executive Board endorsed the recommendations made by MICA as the official stand of the Association on this matter.

Council on Public Health and Regulatory Veterinary Medicine Meets

The AVMA Council on Public Health and Regulatory Veterinary Medicine met in Chicago, April 24-25, 1961.

At the meeting the Council passed a resolution urging USDA to protect U.S. livestock against exotic diseases by increasing inspection personnel at ports of entry of foreign animals and by modernizing inspection and quarantine facilities. The Council members expressed concern over the continuing spread and development of epizootics in foreign countries. They feel that modern transportation has put an end to an era when distance alone can be relied upon for isolation and quarantine as a defense against exotic diseases such as African horse-sickness and African swine fever. They urged in their resolution that additional precautions be taken to prevent these diseases and others from entering the United States.

The Council recommended that the J.A.V.M.A. carry a special Council report pointing out the danger of introducing such diseases in the United States, and the need for alertness on the part of practicing veterinarians in recognizing these diseases if they should appear. The report would also carry pertinent information on foreign diseases to aid practitioners in recognizing them.

The publication of 2 brochures on meat inspection will be recommended to the Executive Board by the Council. The booklets—one for the general public, the other for the profession—will point out the importance of state and local meat inspection as a supplement to federal inspection. The Council is planning a continuing education program along these lines. It plans to supply written and audiovisual information on meat inspection to state and local veterinary associations in a long-range program.

As part of this program, the Council has

secured the assistance of AVMA's director of public information in preparing a speakers kit on the veterinarian in public health. The kit will be available to speakers in state and local associations.

The Council considered a proposed survey of primary public health, regulatory, and military positions held by veterinarians in the United States. Approval will be requested of the Executive Board before the survey is actually conducted. If it is approved, this project will have second priority after the meat inspection brochures in Council activities for the coming year.

A pamphlet distributed by the National Safety Council and entitled, "Animal Diseases and the Farmer," was reviewed by the Council. The National Safety Council has requested that the pamphlet be updated by the AVMA Council. The Council has agreed to do so.

A committee of the Council was appointed to work with the Committee on Academic Affairs of the Council on Education to set up standards for courses to provide in-service or postgraduate training for public service personnel to better equip them to serve



Members of the Council on Public Health and Regulatory Veterinary Medicine are shown at their meeting in Chicago. They are (left to right): Drs. H. G. Geyer (OSU '36); D. W. Glascock (ISU '28); R. L. Knudson (OSU '34); Oscar Sussman (MSU '40); and C. D. Van Houwelling (ISU '42).



Other Council members at work are (left to right): Drs. Kenneth Wells (ONT '38); E. S. Tierkel (UP '42); C. L. Campbell (OSU '45), vice-chairman; Russell McNellis (ISU '28), secretary; and R. K. Anderson (COL '44), chairman.

the profession, the public, and their government agency.

Dr. J. D. Lane (ISU '43), director of the Meat and Dairy Hygiene Training Center, Chicago, appeared before the Council. He was asking for suggestions on the program

for a seminar for meat hygiene teachers to be held in Chicago, June 12-16, 1961.

The Council appointed a committee to work with similar committees of the Councils on Veterinary Service and Biological and Therapeutic Agents in developing proposed policies of the AVMA on the use of chemicals in agriculture. Council members appointed to the committee are: Drs. C. D. Van Houweling (ISU '42), Oscar Sussman (MSU '40), and D. W. Glascock (ISU '28).

Also at the meeting, the Disease Research Committee of the Council was requested to prepare for the JOURNAL capsule reports containing information on bovine tuberculosis and rabies and their control; the Council endorsed the recommendation of the Council on Veterinary Service on hog cholera eradication; and the Council also endorsed the recommendations of the Council on Biological and Therapeutic Agents stating AVMA opposition to the Delaney clause which would restrict the exercising of scientific judgment by the veterinary staff of the Food and Drug Administration.

APHA Southern Branch Meets

The Southern Branch, American Public Health Association, which comprises 17 southern states, held its 29th annual meeting in Louisville, Ken., April 12-14, 1961.

Veterinarians appearing on the program spoke on zoonoses. They were featured at 2 joint sessions—one the Health Officer and Biology Sections, the other the Laboratory and Biology Sections.

At the Health Officer-Biology session, Dr. Luther Frederickson (MSU '37), Nashville, Tenn., presided. The program consisted of a panel on rabies on which Drs. Ernest Tierkel (UP '42), Atlanta, Ga., appeared. Papers were presented during this session by Dr. Stanley Hendricks (ISU '34), Des Moines, Iowa, who spoke on brucellosis among abattoir workers, and Dr. Paul Schnurrenberger (OSU '53), Columbus, Ohio, who discussed trichinosis studies in Ohio.

The Laboratory-Biology session featured papers by Dr. Paul Schnurrenberger, "Pre-exposure Human Rabies Immunization with Avian-Embryo Vaccine," Dr. D. H. Ferris (ILL '53), Urbana, Ill., "Q-Fever Studies in Illinois," Dr. James Scatterday (OSU '33),

Jacksonville, Fla., "Arthropod-borne Encephalitis in Florida," and Dr. Daniel Brown (AUB '56), Oak Ridge, Tenn., "Radiological Damage to Large Animals." Dr. Charles Caraway (TEX '46), New Orleans, La., presided over the session.

At the business meeting of the Biology Section, Dr. Martin Marx (TEX '51), Richmond, Va., was nominated chairman of the Biology Section for the 1962 meeting to be held at Roanoke, Va. Dr. Joe Held (CAL '55), Atlanta, Ga., was nominated vice-chairman, and Dr. Joie Skaggs (OSU '55), Louisville, Ken., was nominated secretary.

Tape Recorded Subscription Service for Veterinarians Proposed

Utilizing the same experience, talent, and format that have proved so successful in keeping American M.D.'s abreast of medical progress, a new tape-recording subscription service may soon be available to veterinarians.

This new service for veterinarians only

is being considered in response to requests from all parts of the country. If such a service is launched, it is contemplated that selected editors within the profession would abstract the cream of journal articles relating to the general practice of veterinary medicine. In addition, direct recordings of leading local and national veterinary meetings would be made the year around; the digested highlights (both in abstracts and in "live" recordings) would be passed on to subscribers in an hour-long tape that may be listened to at home, office, or in automobiles on a special small tape recorder that can also be used for dictation.

The decision to begin this new educational venture will be based upon demand. Two

hour-long tapes per month are planned, and the subscription rate (tax deductible) would be \$81.30 per year (10% discount for payment in advance). If the service is instituted on a monthly basis it would cost \$40 per year.

Veterinarians interested in becoming charter subscribers are invited to mail a postcard (no money) to the Southern California Veterinary Medical Association, 1919 Wilshire Blvd., Los Angeles 57, Calif., indicating whether: "I will subscribe to this series with the first issue," "I prefer every-other-week or monthly issuance," "I do (or do not) presently own a tape recorder playing either 1% or 3% ips."

Flying Veterinarians Association Meets

The first meeting of the Flying Veterinarians Association was held in St. Louis, Mo., April 18, 1961, during the annual meeting of the American Animal Hospital Association. Fifteen veterinarians attended the meeting.

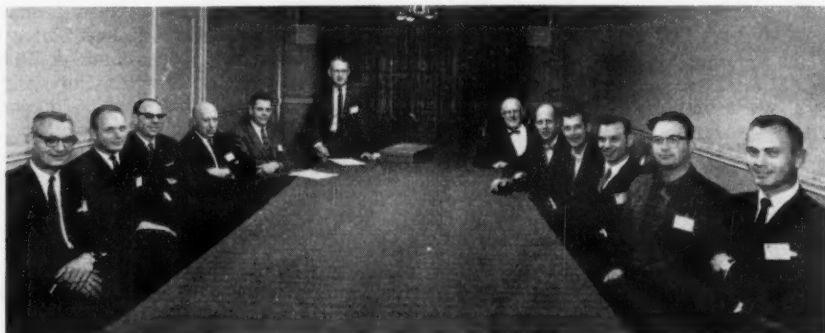
This meeting was devoted mainly to developing lists of potential members. The association now has a list of 80 veterinarians from 28 states, including Alaska and Hawaii.

The next meeting of the Flying Veterinarians Association will be held during the

AVMA convention in Detroit, August 22. At this meeting, officers will be elected and a charter stating the aims and objectives of the association will be drafted.

Membership in the association is open to veterinarians who are licensed pilots or are in the process of completing training. Ownership of an aircraft is not a membership requirement.

Veterinarians interested in obtaining more information about the Flying Veterinarians Association should contact Dr. Jack R. Dinsmore, Box 233, Glenview, Ill.



Veterinarians who attended the first meeting of the Flying Veterinarians Association are shown here. They are (left to right): Drs. F. O. Garrett, Jr. (AUB '38), North Little Rock, Ark.; D. T. Albrecht (ISU '50), Denver, Colo.; L. T. Boley (KSU '49), Kewanee, Ill.; E. G. Cole (COL '36), Sioux City, Iowa; C. R. Griffith (COL '50), Seattle, Wash.; Jack R. Dinsmore (OSU '41), Glenview, Ill.; T. M. McIntyre (COL '44), Daly City, Calif.; A. W. Lundberg (COL '45), Lawndale, Calif.; W. A. Kimball (MSU '53), Torrance, Calif.; S. I. Shaff (COR '59), New City, N.Y.; K. W. Downey (KSU '42), Green Bay, Wis.; and M. H. McMillan (ISU '44), Pharr, Texas. Drs. M. H. Phillipson (ONT '49), Las Vegas, Nev.; Warren Evers (MSU '45), Racine, Wis.; and William Zontine (COL '42), Lancaster, Calif.; also attended the meeting but were not present when the picture was taken.

Correspondence Course Offered

A laboratory animal care correspondence course is being offered by the Ralston Purina Company, Educational Department.

The course features 4 lessons and quizzes, and a loan of two 35-mm. color sound film strips. Subjects covered in the course will be: (1) introduction to laboratory animals—a brief history of animals used in research and a preview of disease in an animal colony; (2) laboratory animals—environmental requirements, life cycle data, strains, definitions; (3) housing, equipment, and handling; (4) laboratory animal diseases and their control; and (5) special supplements on selected topics concerning laboratory animal care.

The course is being offered to "everyone working with small animals." The cost is \$5.

Among the States and Provinces

Alabama

VETERINARY ASSOCIATION SHARES EXPERIENCE WITH STUDENTS.—The Public Relations Committee of the Alabama V.M.A. has been working closely with the Interprofessional Relations Committee of the Student Chapter of the AVMA at Auburn so that they might learn about actual problems faced by the veterinary profession in the field of public relations.



A joint meeting of the 2 committees was held in Birmingham, Jan. 15, 1961. At this meeting the students saw veterinary public relations at work and exchanged ideas with veterinarians on the public relations needs of the veterinary profession.



New officers of the Alabama V.M.A. are (seated left to right): Drs. Ray Dunlap (AUB '48), Guntersville, retiring president; W. P. Monroe (AUB '50), Anniston, president; Rufus O. Moore (AUB '38), Tuscaloosa, president-elect; and M. K. Heath (AUB '19), Auburn, secretary-treasurer. Standing are Drs. Lawrence Cottle (AUB '44), Mobile, executive board member; J. W. Williams (AUB '47), Luverne, vice-president; and James L. Chambers (AUB '50), Montgomery, executive board member.

Colorado

DR. W. D. CARLSON TO HEAD RADIATION TRAINING PROGRAM.—The United States Department of Health, Education and Welfare has designated Colorado State University as the Rocky Mountain regional training center for radiation health specialists. Dr. William D. Carlson (COL '52), associate

Students, veterinarians, and faculty advisors attending the joint student-veterinarian public relations meeting were (seated left to right): Mr. Charles B. Johnson, Stuart, Fla.; Mr. B. M. Henson, Red Bay, Ala.; and Mr. Hassel B. Smith, Lascassas, Tenn. Standing are: Drs. E. O. Bentley (AUB '52), Sylacauga, Ala.; W. R. Miller (AUB '50), faculty advisor; Frank Gravlee (AUB '56), Florence, Ala.; Clarke L. Holloway (API '49), faculty advisor; S. R. Monroe, Jr. (AUB '50), Gadsden, Ala.; and Allen Price (API '52), Birmingham, Ala.



The 4 Colorado State University scientists who will work on regional radiation health training program examine the university's single channel gamma spectrometer, part of the equipment to be used in the training project. They are (left to right): Drs. Lawrence Hadley, professor and acting head, physics department, and director of the CSU Radiation Institute; Robert Thompson, associate professor of chemistry in charge of the radiation chemistry laboratory; Robert Johnson, assistant professor of physiology and associate project director; and William Carlson, associate professor of veterinary radiology and project leader.

professor of radiology, College of Veterinary Medicine, is in charge.

Colorado State University is one of 9 universities throughout the country receiving Department of Health, Education and Welfare grants for training radiation control specialists for radiological health programs in government and industry. The University was awarded a \$138,240 contract for a 5-year project to begin on June 15, 1961.

Dr. Carlson said the grant provided for the hiring of a radiologic health specialist to head the program and also for the establishment of 2 fellowships each year.

Other schools selected to participate in the training program are the universities of Florida, Minnesota, North Carolina, Pittsburgh, Texas, New York, Johns Hopkins, and Columbia.

Idaho

In a new interstate program in Montana, Wyoming, and Idaho, moose are given injections of a tranquilizer from a dart gun, then tagged to obtain migration information from future observation. The tranquilizing drug method is also used on black bears, goats, and deer. Here Idaho Fish and Game Department biologist Errol A. Nielson, right, ear-tags a bull moose after placing a colored band around his neck, while Dr. F. B. Kinghorn (COL '52), Idaho deputy state veterinarian, watches.

Illinois

NORTHERN ILLINOIS V.M.A.'s SPONSOR CLINIC.—A one-day clinic was sponsored by the Chicago and the Northern Illinois V.M.A.'s at St. Charles, Ill., April 26, 1961.

There were 5 sections scheduled for the day—large animal, swine, equine, bovine, and small animal. Twenty speakers made the presentations.

More than 250 veterinarians attended the clinic.

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CHICAGO V.M.A. SPONSORS COURSE.—The second postgraduate course sponsored by the Chicago V.M.A. this year is scheduled for June 4-7, 1961, at the Cook County Graduate School of Medicine, Chicago, Ill.

Veterinary neurology will be the subject of the course. It will be conducted by Dr. John T. McGrath (UP '43), professor of veterinary pathology, University of Pennsylvania. Dr. McGrath will use basic information from his book, "Neurological Examination of the Dog," in presenting the course.

The registration fee is \$50 and includes a manual entitled "Essentials of Clinical Neuroanatomy and Neurophysiology."

Indiana

DR. O. S. DAVIS RECEIVES STUDY GRANT.—Dr. Olive S. Davis, assistant professor of veterinary anatomy in the School of Veterinary Science and Medicine, Purdue University, has recently received a grant from



the National Cancer Institute of the U.S. Public Health Service for a 5-year study of the transmissibility of avian lymphomatosis to mammals. The sum of \$76,772 has been appropriated to cover this investigation.

Dr. Davis has been doing research on avian visceral lymphomatosis since 1944 and has been investigating the transmissibility of this disease to mammals since 1954. Formerly a member of the department of veterinary science at Purdue University, Dr. Davis has been a member of the department of veterinary anatomy since 1959.

It is hoped that this study may be of value in determining the cause of certain forms of cancer in mammals.

Iowa

DR. W. R. PRITCHARD JOINS UNIVERSITY STAFF.—Dr. William R. Pritchard (KSU '46) has been appointed professor and associate director of the Veterinary Medical Research Institute, Iowa State University, Ames.

Dr. Pritchard will join the university staff on August 1. He has been head of the Department of Veterinary Science at the University of Florida since 1957.

Dr. Pritchard holds a Ph.D degree from the University of Minnesota, 1953. He was an assistant professor from 1946 to 1949 at the University of Wisconsin, associate professor from 1949 to 1953 at the University of Minnesota, and professor from 1953 to 1957 at Purdue University.

His main research interest is physiology, particularly the blood-vascular system. He had studied anemia in domestic animals and enteroviruses of cattle. Dr. Pritchard is a consultant for the Rockefeller Foundation and will study the veterinary needs of Colombia during June and July.

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NORTH CENTRAL IOWA V.M.A. MEETS.—The annual meeting of the North Central Iowa V.M.A. was held in Fort Dodge, April 20.

Officers elected at the meeting are: Drs. R. A. Telleen (ISU '51), Jefferson, president; R. L. Veach (ISU '52), Webster City, president-elect; and J. R. Eppley (OSU '58), Fort Dodge, secretary-treasurer.

Dr. D. J. McKenna (ISU '54), the association's retiring president, was asked to serve

as the association's representative on the advisory council and the publicity committee of the Iowa V.M.A.

Massachusetts

HEAD OF DEPARTMENT OF VETERINARY SCIENCE NAMED.—Dr. Glenn H. Snoeyenbos (MSU '45) has been named head of the De-



Dr. Glenn H. Snoeyenbos

partment of Veterinary Science, University of Massachusetts. He was formerly a research professor of avian pathology in the department.

Dr. Snoeyenbos, who has been acting head of the department since January 29, succeeds Dr. K. L. Bullis (ISU '28), who retired at that time.

Dr. Snoeyenbos has been engaged in poultry diagnostic work, research, and extension activity since joining the university staff in 1947. Active in the department's pullorum-typhoid poultry disease control program, he spearheaded the development of a statewide fowl typhoid program that virtually eradicated the disease in Massachusetts.

He has done considerable research in poultry diseases, including original basic research on virus hepatitis in turkeys. He is

the author of 25 scientific papers and has written many articles appearing in poultry and other educational magazines.

The Department of Veterinary Science which Dr. Snoeyenbos will head is a department in the University's College of Agriculture which works in all 4 areas of teaching, research, extension, and control. Pullorum testing is a major part of control work. There are 18 professional and about 40 supporting staff members in the department. The poultry diagnostic laboratory located at the Waltham Field station is a branch of veterinary science.

Dr. Snoeyenbos was assistant station veterinarian at the University of Minnesota for a year before going into private practice at Bowling Green, Ohio, in 1946. He is a member of the AVMA, the Massachusetts V.M.A., and the American Association of Avian Pathologists and Poultry Science.

Michigan

MAP ELECTS VETERINARIAN AS TREASURER.—At the annual meeting of the Michigan Association of the Professions last February, Dr. Hollis Clark, Jr. (MSU '54), Holland, was elected treasurer of the association.

There are 3,606 members in MAP: 193 architects; 848 dentists; 518 engineers; 627 lawyers; 175 pharmacists 1,162 physicians; and 83 veterinarians.

All members in good standing in their individual professional state association are eligible for membership in MAP.

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DR. I. F. HUDDLESON WINS DISTINGUISHED FACULTY AWARD AT MSU.—Dr. I. F. Huddleson (MSU '25), professor of microbiology and public health at Michigan State University, was given a Distinguished Faculty Award.

The award, \$1,000, is supported by MSU alumni through the university's Development Fund. Dr. Huddleson was one of 5 professors selected this year for the honor.

He has worked for 46 years on the brucellosis research project at Michigan State University. He pioneered the study of brucellosis in man and animals, investigating its detection and treatment, the isolation and differentiation of the organisms, and the basic chemistry of *Brucella*. He has written

2 books on brucellosis and is the author of more than 170 scientific reports and bulletins.

Dr. Huddleson has been the recipient of many awards. In 1944 he received the first Borden Award of the AVMA "for comprehensive research on brucellosis, including development of the new extensively used rapid plate methods of blood testing cattle for brucellosis."

Other awards he has received are the Kimble Award, the International Veterinary Congress Prize (1940), and the Pasteur Award.

Nebraska

DR. J. M. AIKEN RECEIVES FELLOWSHIP.—Dr. John M. Aiken (KSU '49) has been awarded a 2-year postdoctoral fellowship by the National Institute of Allergy and Infectious Diseases for research training in the Department of Veterinary Science at the University of Nebraska



Dr. John M. Aiken

Dr. Aiken is taking a leave of absence from his position with Baldwin Laboratories, Omaha, Neb., to accept the fellowship.

As his research project, Dr. Aiken has chosen the study of virus latency and the cross-interference of viruses in the establishment of immunity. Pathogen-free, coelostom-deprived pigs will serve as the

definitive experimental host in these studies and will be supplemented with tissue culture systems as auxillary hosts. He will be appointed to the University staff as a research associate during the tenure of the fellowship.

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SWINE CONFERENCES SLATED AT UNIVERSITY OF NEBRASKA.—Swine will be the topic of the day at the new Nebraska Center for Continuing Education, Lincoln, June 27-29, 1961.

Scheduled for June 27 is a one-day workshop on hog cholera eradication. On June 28-29, the Swine Repopulation Conference will be held.

Speakers scheduled for the hog cholera eradication workshop are: Dr. Robert Knudson (OSU '34), who will discuss "Why Hog Cholera Eradication?"; Dr. G. H. Wise (MSU '43), "Methods to Consider in Hog Cholera Eradication Programs"; Willard Waldo, "A Producer Looks at Hog Cholera Eradication"; Dr. W. H. Beckenhauer (KSU '51), "The Commercial Biological Producer Views Eradication Problems"; and Dr.



The new Nebraska Center for Continuing Education contains meeting rooms as well as housing accommodations. It is located on the campus of the University of Nebraska's College of Agriculture in Lincoln.

George Young (COR '43), "The Use of Rabbit Origin Hog Cholera Virus as Opposed to Other Attenuated Hog Cholera Virus." Dr. F. J. Mulhern (AUB '45) will give the summation at the meeting. The program was designed for extension veterinarians; however, all veterinarians are welcome.

The 2-day Swine Repopulation Conference will consist of lectures and general discussions. Some topics to be discussed are "Problems Posed to SPF Pigs by Parasites," by G. W. Kelley; "The Diagnostic Laboratory in the SPF Program," by O. D. Grace (COL '40); and "Farm Performance of SPF Pigs," by L. C. Welch.

The registration fee for the Swine Repopulation Conference will be \$20. Accommodations will be available at the Nebraska Center for Continuing Education.

Pennsylvania



Veterinarians taking the 1961 postgraduate short courses March 27 to 30 at the University of Pennsylvania School of Veterinary Medicine, Philadelphia, are shown here. Five courses were offered: general surgery, veterinary dermatology, bovine medicine, clinical cardiology, and small animal diagnostic radiology. Thirty-nine veterinarians from 15 states and the District of Columbia successfully completed the courses presented by a team of the school's faculty members. The attending practitioners received concentrated instruction in classroom, laboratory, and clinic. The 1961 postgraduate program was the 12th of its kind to be conducted by the University's 77 year-old School of Veterinary Medicine.

Oklahoma

DR. A. A. KAMMERLOCHER GOES TO ETHIOPIA.—Dr. Anton A. Kammerlocher (OKL '57) has accepted a 2-year appointment as veterinarian on the staff of the Imperial Ethiopian College of Agriculture and Mechanical Arts at Alemaya, Ethiopia.

Dr. Kammerlocher and his wife left Oklahoma for Addis Ababa, capital of Ethiopia, on May 24. They will live on the 1,000-acre college campus, which is located about 300 miles east of Addis Ababa.

Following 3 months of livestock inspection work in Indianapolis, Ind., for USDA immediately after graduation from veterinary college, Dr. Kammerlocher joined the U.S. Air Force and served as veterinary officer in public health and food inspection from October, 1957, until his recent resignation with the rank of captain.

For assistance in curtailing an encephalitis epizootic in 1958, he was awarded the Air Force Commendation Medal. In February, 1961, he was honored by the civil governor of Angra do Heroismo district, Azores Islands, for assistance in organizing a dairy cooperative to increase milk production and processing in the district.

The Ethiopian college at which he is working was established in 1952 by Oklahoma State University, as part of a technical assistance program in agriculture through the Point Four program. Enrollment is 200. The college has 25 buildings and dwellings, and grants the B.S. degree in animal science, plant science, and general agriculture. It is located in the Chercher Highlands, one of the principal agricultural areas of Ethiopia.

Wisconsin

VETERINARIANS ATTEND RADIOLOGIC CIVIL DEFENSE COURSE.—About 35 veterinarians, most of whom are associated with the Wisconsin Department of Agriculture, attended a 2-day course on the radiologic aspects of civil defense in order to learn how to apply their professional talents in case of a nuclear attack. The course was given at the State Hygiene Laboratory on the campus of the University of Wisconsin, at Madison, April 18-19, 1961.

The 1st day's session, sponsored by the Wisconsin State Board of Health and presided over by A. A. Erdmann (OSU '43),

chief veterinarian for Wisconsin, dealt with radiologic detection and monitoring. Subjects discussed were radiation physics, bomb phenomenology, radiant energy, physiologic effects of gamma radiation, problems associated with fallout, radiation decay, shelters, and shielding. Also included in the program were practical exercises in which each participant learned how to use special equipment such as dosimeters and geiger counters.

The second day's session was conducted by an ARS radiologic defense training team consisting of Drs. Frank A. Todd (ISU '33), James D. Lane (ISU '43), and R. A. Moody (ISU '55). In this session the clinical signs and lesions in domestic animals, resulting from radiation exposure, were described. The means of protecting animals from radiation contamination, the effective protection given by different types of buildings, the means of salvaging and decontaminating pastures, methods of decontaminating food products and water destined for human consumption, and salvage of contaminated livestock were discussed in detail.

Veterinary Military News

Pathology Course Offered

The 8th annual course on the Pathology of Diseases of Laboratory Animals presented by the Armed Forces Institute of Pathology, Washington, D.C., is scheduled for presentation Sept. 25-29, 1961.

The course is designed to provide training for scientists who are responsible for the recognition and interpretation of spontaneous or induced lesions in experimental animals. Although pathology will be the theme of the course, a discussion of etiology, diagnosis, and control of the diseases under consideration will be included.

A limited number of spaces have been allocated for civilian scientists who wish to attend the course, even though it is primarily designed for military personnel. Applications for attendance may be obtained by writing to the Director, Armed Forces Institute of Pathology, Washington 25, D.C. Deadline for applications is Aug. 15, 1961.

State Board Examinations

FLORIDA—June 15-17, 1961, Biscayne Terrace Hotel, Miami, Fla. Dr. E. F. Thomas, Secretary, 4937 S. Tamiami Trail, Sarasota, Fla.

GEORGIA—June 15-16, 1961. Atlanta, Ga., Dr. A. M. Mills, Secretary, 325 Pinecrest Dr., Athens, Ga.

IOWA—June 1-2, 1961, Division of Animal Industry, State House, Des Moines 19, Iowa. Dr. A. L. Sundberg, chief Division of Animal Industry, State House, Des Moines 19, Iowa.

MARYLAND—June 5-6, 1961, College Park, Md., 8:00 a.m. Applications must be returned by May 31, 1961. Dr. Harold S. Gober, Secretary-Treasurer, 5400 Park Heights Ave., Baltimore 15, Md.

MASSACHUSETTS—June 19-21, 1961, University of Massachusetts, Amherst. Applications must be filed by June 1, 1961. Dr. Edward A. Zullo, Secretary, Room 33, State House, Boston 33, Mass.

MICHIGAN—June 12-13, 1961, Auditorium, Giltner Hall, Michigan State University, East Lansing, Mich. Applications must be filed 15 days prior to examination along with \$25 fee. Dr. John F. Quinn, Corresponding Secretary, 6th Floor, Lewis Cass Building, Lansing 13, Mich.

MISSOURI—June 1-2, 1961, School of Veterinary Medicine, University of Missouri, Columbia, Mo. Dr. L. A. Rosner, Chairman, Box 630, Jefferson City, Mo.

MONTANA—June 12-14, 1961. Helena, Mont. Applications and fee must be received by office by June 1, 1961. Dr. J. W. Safford, Secretary-Treasurer, Capitol Station, Helena, Mont.

NEVADA—June 21-23, 1961, State Department of Agriculture Building, 350 Capitol Hill Ave., Reno, Nev. Fee \$100. Dr. John L. O'Harra, Secretary-Treasurer, P.O. Box 1209, 350 Capitol Hill Ave., Reno, Nev.

NEW HAMPSHIRE—July 5, 1961, State House, Concord, N.H., 9 a.m., Dr. Eric W. Simmons, secretary-treasurer, Exeter Road, North Hampton, N.H.

NORTH CAROLINA—June 21-23, 1961, Morehead-Biltmore Hotel, Morehead City, N.C. Dr. James I. Cornwell, secretary, P.O. Box 9038, Asheville, N.C.

OHIO—June 5-7, 1961, Sisson Hall, College of Veterinary Medicine, Ohio State University, Columbus, Ohio. Dr. H. G. Geyer, Executive Secretary, State of Ohio Department of Agriculture, Division of Animal Industry, Columbus 15, Ohio.

OREGON—June 6-8, 1961, Hotel Multnomah, Portland, Ore. Application deadline one month prior to examination. Fee \$25. Dr. C. R. Howarth, Secretary, 135 N. Highway, St. Helens, Ore.

SOUTH CAROLINA—June 15-16, 1961, Columbia Hotel,

Columbia, S. Car. Dr. H. L. Sutherland, Secretary-Treasurer, Union, S. Car.

UTAH—June—29, 1961, Department of Business Regulation and Registration, State Capitol Building, Salt Lake City, Utah, 9 a.m. Applications must be filed by June 15, 1961. Fee \$15. Dr. Frank Lees, Director of the Office of Business Regulation and Registration, State Capitol Building, Salt Lake City, Utah.

WEST VIRGINIA—June 19, 1961, Capitol Building, Room 117, Charleston W. Va. Dr. H. J. Fallon, Secretary, 200 Fifth St., W., Huntington, W. Va.

WISCONSIN—June 26-27, 1961, Madison, Wis. Dr. A. A. Erdmann, Secretary, 6 W. State Capitol, Madison 2, Wis.

Deaths

Star indicates member of AVMA

***George Rogoff** (API '42), 40, New York, N.Y., died March 1, 1961, of a heart attack at an executive board meeting of the New York State Veterinary Medical Society.

Dr. Rogoff was business manager and a founder of the society's monthly journal. He was also a past president of the Bronx V.M.A.

W. T. Stroud (STJ '18), Excelsior Springs, Mo., died March 16, 1961.

Dr. Stroud practiced veterinary medicine for several years and later entered the furniture and undertaking business in Norborne, Mo. More recently he worked in farm management.

Leo Vogelmann (TEX '43), 44, Houston, Texas, was killed in an automobile accident in March, 1961.

Dr. Vogelmann was a small animal practitioner.

Fred Weitzel (UP '02), 86, Saxonburg, Pa., was struck and killed by an automobile on Feb. 3, 1961.

Dr. Weitzel had retired from an Allegheny County veterinary practice 9 years ago.

Women's

Auxiliary

India—Land of Contrasts

Dr. and Mrs. R. E. Swope (UP '43) were sent to India under the auspices of the International Cooperation Administration under contract to Kansas State University. Dr. Swope was assigned as advisor to the Veterinary College at Mhow, Madhya Pradesh, to assist in development and integration of the teaching, research, and extension programs there. In the following article, Mrs. Swope tells of India as she saw it during their 2-year stay.

India—land of contrasts! No statement could express more truth about this country. There are, of course, extreme differences in Eastern and Western culture—and the contrasts of the traditions and customs of India and our jet-age society must be adjusted to. Once the initial impact subsides, and you begin to absorb the atmosphere and environ-

ment of India, there immediately develops a realization that the most marked contrasts are not international, but rather intranational.

Provincialism is quite evident in India. And so language, food, housing, clothing, and customs are amazingly different as one moves from state to state within the Indian Union.

The North Indian speaks Hindi, or some derivation of it; the South Indian, Tamil, Telegu, Marathi, and others which are distinctly different. In parts of India, wheat is the basic food, while in other sections rice is. Housing varies from the brick of Northern India to the grass huts of South India and to the well-known, mud-walled houses of Central India. Sanitation varies from using the open fields to a "western style" bathroom. Very few homes have indoor running water. Some Indians have



The Swopes and visitors are shown in India. They are (left to right): Rob Swope, Mrs. E. E. Leasure, Mrs. R. E. Swope, and Mrs. I. D. Wilson.

never ridden in anything faster than a bullock cart, while others pilot their own planes.

Women's clothing is fairly consistent, but the sari, the national dress of India, may be wrapped in many different ways. Northern Indian women (Punjab) wear the "salwar kamiz," a long shirt, split at the sides like the Vietnamese dress, and worn with a loose trouser made of white cotton. The women drape a light scarf over their shoulders or heads, the ends falling loosely behind. Muslim women wear a similar outfit but the trousers are tight fitting and they wear a burkha (a cloak that covers them from head to toe with a "screened area" so that they may look out.)

Men wear many combinations varying from strictly western style to the conventional and official Indian "dhoti" (a piece of white cotton about 5 or 6 yards long draped around the waist and between the legs) which may be worn in various ways apparently depending on the dexterity or originality of the man who "wraps" it. The loose pajama is a favorite with the Muslims and is worn with a loose shirt with the shirt-tail worn on the outside. Muslims also wear a lungi (several yards of colorful cloth wrapped around the waist touching the ankle) with the loose shirt. The tight pajama (churidar), the long coat with a closed, high collar (achken), and the Gandhi cap is the formal dress for men. Even the turban, the most popular Indian headgear, has a variety of styles.

In the rural areas, where 80% of the population lives, old traditional customs are not giving way to modernization as quickly as in the cities. This was the picture of India to which we were exposed. It is impossible to truly describe the poverty in which these people live. Often three or four generations live together sharing their assets and liabilities. When sons marry, their wives are brought home to become part of his "joint family." Space and privacy are nonexistent in these homes. Each member of the family is responsible for the performance of a particular task within the household and, since mechanization of the daily chores is unheard of in rural India, the Indian women face a long and laborious day.

We lived in central India—the only Americans in a town of 50,000 persons. Living was comfortable and, with no radio, television, or telephone to detract us, we soon found

the advantages of escaping the hurried life experienced here at home. Our social affairs were limited to dinners and teas for the faculty and other Indian friends and missionaries. At night we would go to sleep to the sounds of bullock carts and jackals.

Among the travelers who made our home a temporary stop were Dr. and Mrs. E. E. Leasure. Dr. Leasure paid an official visit to the institution where we were serving while Mrs. Leasure relaxed by pencil sketching Indian scenes.

Alabama



New officers of the Women's Auxiliary to the Alabama V.M.A. are (left to right): Mrs. J. W. Miller, Enterprise, secretary-treasurer; Mrs. T. M. Miller, Dothan, retiring president; Mrs. S. R. Monroe, Gadsden, president; Mrs. Davis Gantt, Andalusia, vice-president; and Mrs. B. N. Lauderdale, Montgomery, historian.

Kansas

SENIOR WIVES LEARN LABORATORY TECHNIQUES.—The senior wives in the Women's Auxiliary to the Student Chapter of the AVMA at Kansas State University were offered a course in laboratory techniques during the last fall semester.

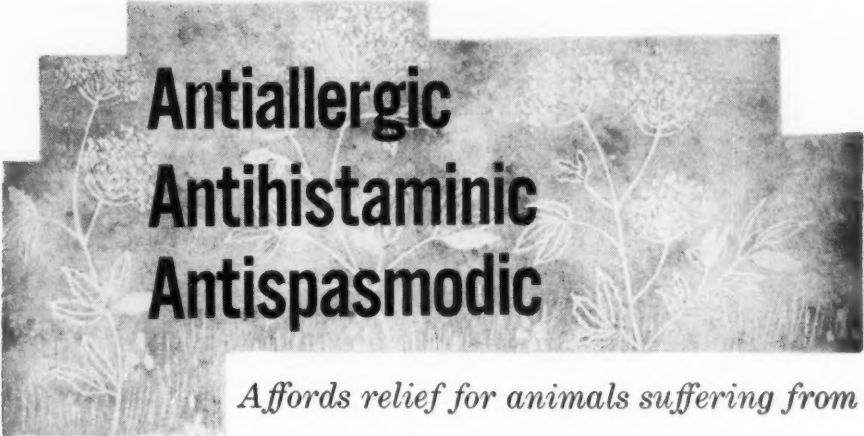
The course, conducted by Dr. Embert H. Coles (KSU '45), associate professor of pathology, was geared to enlightening the senior wives on some of the laboratory procedures they might be called upon to perform in assisting their husbands in general practice. It was given one evening a week for 8 weeks.

Subjects covered during the course were the use of the microscope, fecal and urine examinations, examination of microscope slides, and the use of commercially prepared kits for laboratory determinations.

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WHAT IS YOUR *Diagnosis?*

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Fig. 1—Lateral radiograph of a female German Shorthaired Pointer with clinical signs of gastroenteritis and intermittent vomiting.



Fig. 2—A dorsoventral radiograph of the dog's abdomen following administration of a barium enema.

History—A spayed female German Shorthaired Pointer, 9 months old, was admitted to the clinic with a history of acute gastroenteritis, hemorrhagic diarrhea, and intermittent vomiting for 2 weeks. The white blood cell count was 20,950/cmm. The differential count was: segmented neutrophils 63%, nonsegmented neutrophils 6%, lymphocytes 22%, monocytes 7%, and eosinophils 2%. The packed cell volume was 54%. Internal parasites were not found on fecal examination, but some sand was present. A lateral radiograph of the abdomen was made with the dog in a standing position (fig. 1). A dorsoventral radiograph was made following administration of a barium enema. (fig. 2).

Here Is the Diagnosis

(Continued from preceding page)

Diagnosis—Obstructive or paralytic ileus due to intussusception.

Comment—Gas-capped fluid levels with-

in the small intestine, indicative of either paralytic or obstructive ileus, are visible in the radiographs (fig. 3 and 4). Sand, visible in figure 1, may cause obstruction or sufficient irritation to result in intussusception, so a barium enema was administered to determine presence or absence of intussusception.

Exploratory surgery was performed following the radiographic examination. A 5-inch intussusception of the ileum at the ileocolic orifice was reduced by simple traction. The dog was placed on a gruel diet, and recovery was uncomplicated.

This report was submitted by Joe P. Morgan, D.V.M., assistant radiologist, and William D. Carlson, D.V.M., Ph.D., radiologist, College of Veterinary Medicine, Colorado State University, Fort Collins.

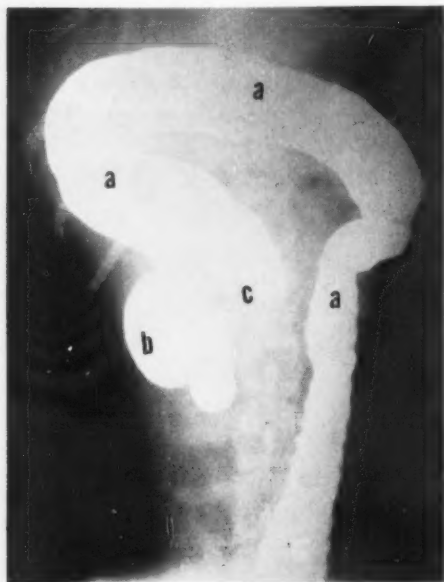


Fig. 3—A dorsoventral radiograph of the dog's abdomen following administration of a barium enema. The entire colon (a) and cecum (b) are filled with the radiopaque medium with the exception of a filling defect near the ileocolic junction (c). The barium could not be forced beyond the ileocolic orifice. These signs strongly suggest presence of an intussusception.

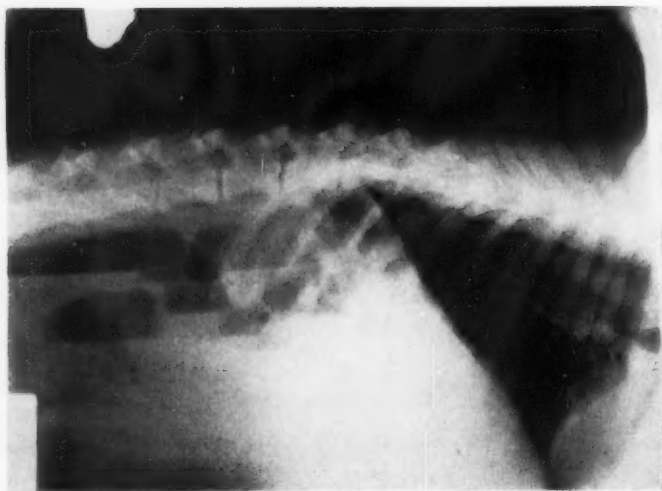


Fig. 4—Another dog with small bowel obstruction, with a more typical pattern of the gas-capped fluid levels.



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REFERENCES: Teigland, M. B.: Proceedings of the 4th Annual Meeting, Amer. Assn. of Equine Pract., Chicago, Illinois, 1959. Witter, R. S.: Paper read at the Third Regional Conference on the Nitrofurans in Veterinary Medicine, Atlanta, Georgia, January 14, 1960.

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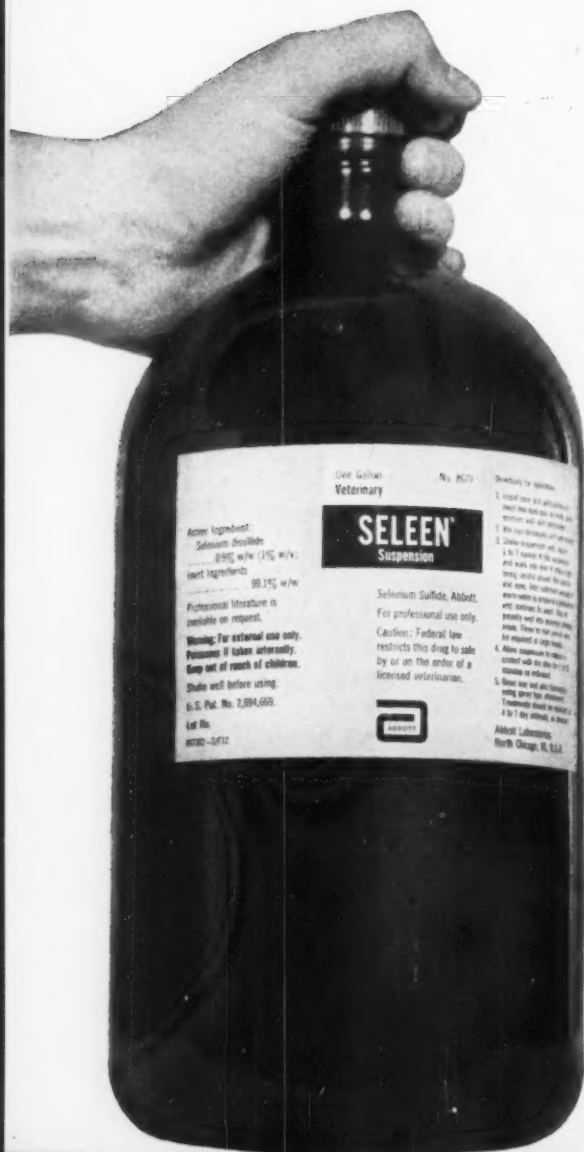
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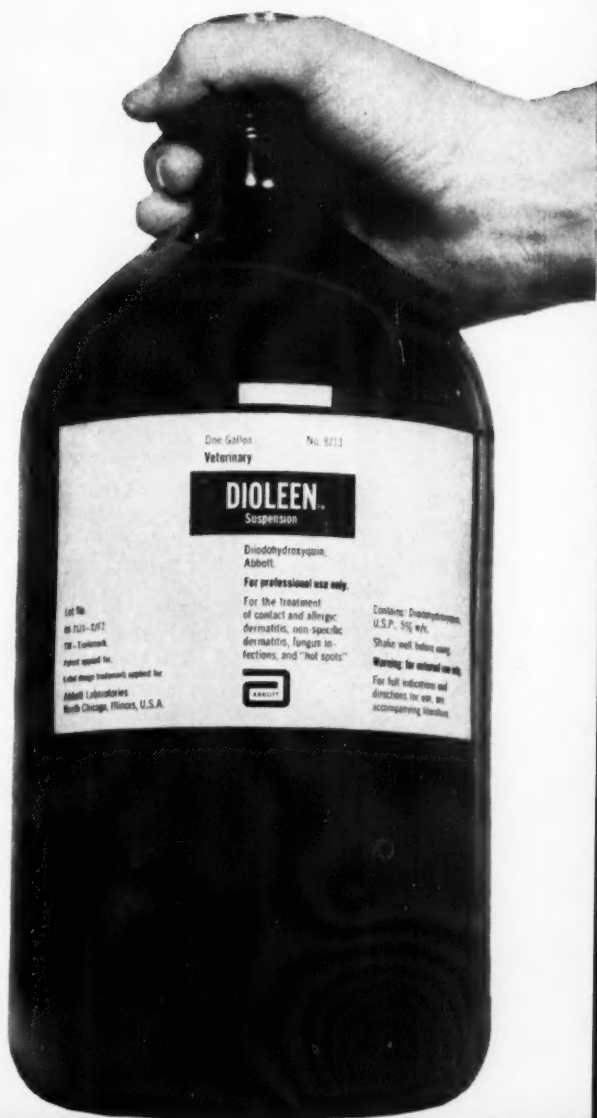
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History of the AVMA

In his presidential address at the 1911 meeting in Toronto, G. H. Glover spoke of many things relating to the general theme. "We are proud of our chosen profession and the progress that it has made . . . Harmony is the prime essential to strength in any institution, and to this factor must be attributed, more than to any other, the rare interest and splendid growth of the American Veterinary Medical Association."

The growth of the Association, although overdue, had been little short of remarkable. Membership (1,189) was twice that of 5 years before, and 3 times that of 10 years earlier. California, which had the grand total of 5 members in 1905, added 36 at the meeting in San Francisco in 1910, and 32 more in 1911. Altogether, 435 new members were added to the roll these 2 years—more than the total membership a decade before. Some of this increased interest in the AVMA undoubtedly can be attributed to moving the meeting site to new sections of the country.

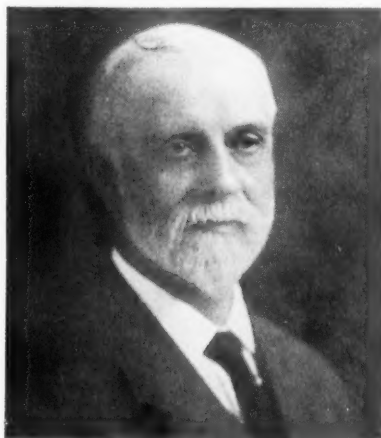
The surgical section featured a report on the roaring operation by W. L. Williams and one on "The Merits of Williams' Operation for Roaring," by Prof. Frederick Hobday of London. In the section on practice, H. Preston Hoskins made his debut with a paper on pneumonia, and K. F. Meyer, recently graduated from the veterinary school at Zurich, spoke on nephritis. Equine anemia was discussed by W. B. Mack, and bovine hematuria by Seymour Hadwen. The sanitary section featured reports by W. H. Dalrymple on anthrax and tick fever; C. D. McGilvray on glanders; and Cassius Way on milk sanitation. John R. Mohler, J. G. Rutherford, and S. H. Gilliland discussed various aspects of the tuberculosis problem.

At the meeting of the Association of Veterinary Faculties and Examining Boards, Dr. Glover, president of this group also, charged that this body ". . . has not fulfilled the mission for which it was created." Unlike the situation in past years, however, a vigorous program included reports by R. A. Archibald on suppression of correspondence schools, SESCO Stewart on uniform state board examinations, R. P. Lyman on fundamental education, Septimus Sisson and I. E. Newsom on anatomical teaching and nomenclature, and

P. A. Fish and S. H. Burnett on physiology and pathology in the curriculum.

As a matter of passing interest, the women, who had attended the meetings for the first time only 15 years earlier, outnumbered members of the Association in attendance at the Toronto meeting.

Samuel Brenton was elected president; C. J. Marshall and G. R. White re-elected secretary and treasurer, respectively.



Dr. Samuel Brenton, AVMA President from 1911 to 1912.

SAMUEL BRENTON was born at Corbyville, Ontario, Oct. 10, 1858, and was graduated from the Ontario Veterinary College in 1880. After practicing at Jackson, Mich., he moved to Detroit in 1887 and established one of the largest practices in the Midwest. He was characterized as ". . . a keen diagnostician, a skillful surgeon and a therapist of rare ability." He was elected president of the Michigan V.M.A. in 1885, served several terms as secretary of the state examining board, and was Professor of Surgery in the short-lived Detroit Veterinary College.

Dr. Brenton joined the AVMA in 1891 and in 33 years of membership attended every annual meeting except one. Four times a member of the executive committee and twice a vice-president, he was elected president of the Association in 1911. At the time of his death on Feb. 16, 1925, he was one of 3 surviving charter members of the Michigan V.M.A.

Coming Meetings

Notices of coming meetings must be received 30 days before date of publication.

June, 1961

Texas, Agricultural and Mechanical College of. Fourteenth annual conference for veterinarians. School of Veterinary Medicine, Agricultural and Mechanical College of Texas, College Station, Texas, June 1-2, 1961. Dr. R. D. Turk, Texas Conference for Veterinarians, School of Veterinary Medicine, College Station, Texas, conference chairman.

Kansas State University. Twenty-third annual conference for veterinarians. Little Theatre, Student Union Building, Kansas State University, Manhattan, Kan., June 11-13, 1961. Dr. John Noordsy, Dykstra Veterinary Hospital, Kansas State University, Manhattan, Kan., chairman.

Kansas Veterinary Medical Association. Semiannual business meeting. Student Union Building, Kansas State University, June 11-13, 1961. Dr. M. W. Osburn, 1525 Humboldt St., Manhattan, Kan., secretary-treasurer.

Virginia Veterinary Medical Association. 2nd annual short course. Virginia Polytechnic Institute, Veterinary Science Department, Blacksburg, June 12-14, 1961. Dr. S. L. Kalbon, Agricultural Extension Service, Virginia Polytechnic Institute, Blacksburg, Va., chairman.

Pennsylvania Veterinary Medical Association. Annual meeting. Pennsylvania State University, University Park, Pa., June 13-15, 1961. Dr. Raymond C. Snyder, Walnut Street and Copley Road, Upper Darby, Pa., secretary.

South Carolina Veterinary Medical Association. Summer program. Columbia Hotel, Columbia, S.C., June 15-17, 1961. Dr. L. D. Rodgers, Greenwood Veterinary Hospital, Box 348, Greenwood, S.C., program chairman.

Montana Veterinary Medical Association. Annual meeting. The Meadow Lark Country Club, Great Falls, Mont., June 16-18, 1961. Dr. G. A. Morrison, 316 Central Ave., W., Great Falls, Mont., secretary.

Wyoming Veterinary Medical Association. Annual meeting. Powell, Wyo., June 18-20, 1961. Dr. J. F. Ryff, P.O. Box 960, Laramie, Wyo., secretary.

Georgia Veterinary Medical Association. Fifty-fifth annual convention. Jekyll Island, Ga., June 18-20, 1961. Dr. A. M. Mills, 325 Pinecrest Dr., Athens, Ga., secretary.

North Dakota State Veterinary Medical Association. Fifty-sixth annual meeting. Ray Hotel, Dickinson, N.D., June 18-20, 1961. Dr. C. B. Bjornson, North Dakota State University, Fargo, N.D., secretary-treasurer.

North Carolina Veterinary Medical Association. Sixtieth annual meeting. Morehead-Biltmore Hotel, Morehead City, N.C., June 19-21, 1961. Dr. J. T. Dixon, 3026 S. Main St., Winston-Salem, N.C., secretary.

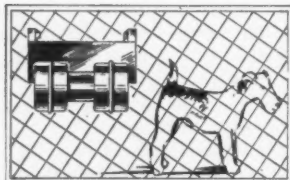
Iowa State University. Annual conference for veterinarians. Memorial Union, Ames, Iowa, June 20-21, 1961. C. D. Lee, Iowa State University, School of Veterinary Medicine, Ames, Iowa, committee member.



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EASILY transferred from cage to cage, this lightweight unit hooks onto any type cage with special 'non-slip' hooks.

Massachusetts Veterinary Association. Summer meeting. University of Massachusetts, Amherst, June 21, 1961. Mr. L. T. Maloney, 6 Beacon St., Boston 8, Mass. consultant.

Minnesota Veterinary Medical Association and South Central Minnesota Veterinary Medical Association. Summer clinic. Owatonna, Minn., June 21, 1961. Dr. Paul Cox, 1005 Mineral Springs Rd., Owatonna, Minn., general chairman.

Maryland State Veterinary Medical Association. Annual meeting. Ocean City, Md., June 22-23, 1961. Dr. Harry L. Schultz, Jr., 9011 Harford Rd., Baltimore 14, Md., secretary.

Idaho Veterinary Medical Association. Annual meeting. Flamingo Motel, Idaho Falls, June 22-24, 1961. Dr. A. P. Schneider, Room 206, Statehouse, Boise, Idaho, secretary.

Saskatchewan Veterinary Medical Association. Annual meeting. Saskatchewan Hotel, Regina, June 23-24, 1961. Dr. W. Turnbull, Department of Health, Saskatoon, Sask., secretary-treasurer.

Utah Veterinary Medical Association. Annual meeting. Utah State University, Logan, Utah, June 26-27, 1961. Dr. J. A. Thomas, Box 592, Provo, Utah, secretary.

Maritime Veterinary Associations. Twelfth annual joint conference. Mount Allison University, Sackville, N.B., June 27-29, 1961. Dr. R. McG. Archibald, P. O. Box 310, Sackville, N.B., Can.

Nebraska, University of. Swine Repopulation Conference. Veterinary Science Department, University of Nebraska, Lincoln, Neb., June 28-29, 1961. Dr. Crosby Howe, Department of Veterinary Science, University of Nebraska, Agricultural Experiment Station, Lincoln 3, Neb., chairman.

July, 1961

Mississippi-Louisiana Veterinary Medical Associations. Bi-state annual meeting. Buena Vista Hotel, Biloxi, Miss., July 2-4, 1961. Dr. J. W. Branson, Box 4223, Fondren Station, Jackson, Miss., secretary; or Dr. R. B. Lank, 246 Guava Dr., Baton Rouge, La., executive secretary.

Nebraska Veterinary Medical Association. Annual summer and clinical demonstration meeting. Town House, Omaha, Neb., July 10-12, 1961. Mr. Bob Garey, Hotel Clarke, Rooms 18-419, Hastings, Neb., executive secretary.

Kentucky Veterinary Medical Association. Fiftieth annual meeting. Sheraton Hotel, Louisville, Ky., July 17-18, 1961. Dr. L. S. Shirrell, 545 E. Main St., Frankfort, Ky., secretary.

Auburn University. Fifty-fourth annual conference for veterinarians. Auburn University, School of Veterinary Medicine, Auburn, Ala., July 23-26, 1961. Dr. J. E. Greene, dean.

August, 1961

International Association of Milk and Food Sanitarians. Golden anniversary meeting. Wanderer Resort Motel, Jekyll Island, Ga., Aug. 14-17, 1961. T. L. Jones, Room 512, 1145 Nineteenth St., N.W., Washington 6, D.C.

American Association of Veterinary Bacteriologists. Annual meeting. Department of Microbiology and Public Health, College of Veterinary Medicine, Michigan State University, East Lansing, Mich., Aug. 18-19, 1961. C. H. Cunningham, Department of Microbiology and Public Health, College of Veterinary Medicine, Michigan State University, East Lansing, secretary.

(Continued on adv. p. 40)



W W CATTLE CHUTE

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Coming Meetings—continued from adv. p. 39.

American Veterinary Medical Association. Ninety-eighth annual meeting. Sheraton-Cadillac Hotel, Detroit, Mich., Aug. 20-24, 1961. Dr. H. E. Kingman, Jr., 600 S. Michigan Ave., Chicago 5, Ill., executive secretary.

International Association of Microbiological Societies. Seventh International Congress of the Permanent Section on Biological Standardization. London, England, Aug. 28 to Sept. 1, 1961. E. C. Hulse, Ministry of Agriculture, Central Veterinary Laboratory, Weybridge, Surrey, secretary of organizing committee.

Electron Microscope Society of America. 19th annual meeting. Pittsburgh Hilton Hotel, Pittsburgh, Pa., Aug. 23-26, 1961. Dr. A. R. Taylor, Research Division, Parke, Davis and Co., Detroit 32, Mich., program chairman.

September, 1961

Animal Care Panel. 12th annual meeting. Statler Hilton Hotel, Boston, Mass., Sept. 27-29, 1961. Dr. Bernard F. Trum, Sherborn, Mass., general chairman.

Oregon Veterinary Medical Association. Fall clinic meeting. Corvallis, Ore., Sept. 28-30, 1961. Dr. K. J. Peterson, Office of the Secretary, Poultry-Veterinary Building, Corvallis, Ore., program chairman.

October, 1961

New England Veterinary Medical Association. Annual meeting. Poland Springs Hotel, Poland Springs, Maine, Oct. 1-4, 1961. Dr. C. Lawrence Blakely, 180 Longwood Ave., Boston, Mass., secretary.

Symposium on Recent Developments in Research Methods and Instrumentation. 11th annual instrument symposium and research equipment exhibit. National Institutes of Health, Bethesda 14, Md., Oct. 9-12, 1961. Mr. James B. Davis, National Institutes of Health, Bethesda 14, Md., executive secretary.

Eastern Iowa Veterinary Association. Annual meeting. Sheraton Montrose Hotel, Cedar Rapids, Iowa, Oct. 12-13, 1961. Dr. William R. Goodwin, Newhall, Iowa, secretary.

Midwest Feed Manufacturers' Association. Centennial Nutrition conference, Kansas City, Mo., Oct. 21-25, 1961. Fennell-Gibson Public Relations, 2201 Grand Ave., Kansas City, Mo.

California Veterinary Medical Association. Annual meeting. Long Beach, Calif., Oct. 23-25, 1961. Mr. Kenneth Humphreys, 3004 Sixteenth St., Rooms 301-303, San Francisco 3, Calif., executive secretary.

Missouri. University of. 37th annual veterinary conference. Columbia, Mo., Oct. 30-31, 1961. Dr. Cecil Elder, Department of Veterinary Pathology, School of Veterinary Medicine, University of Missouri, Columbia, Mo., chairman.

National Association of Federal Veterinarians. Annual meeting. Curtis Hotel, Minneapolis, Minn., Oct. 31, 1961. Dr. F. L. Herchenroeder, Box 3085, Parkfairfax Station, Alexandria, Va., secretary.

Foreign Meetings

Fourth International Congress on Animal Reproduction. The Hague, Netherlands, June 5-9, 1961. For additional information contact: the Secretariat of the Fourth International Congress on Animal Reproduction, 14, Burge-meester de Monchyplein, The Hague, Netherlands, Dr. L. Hoedemaker, secretary to the organizing committee.

Eighth International Congress of Animal Husbandry. Hamburg, Germany, June 13, 1961.

Twelfth World's Poultry Congress. Show Grounds of the New South Wales Royal Agricultural Society, Sydney, Australia, Aug. 13-18, 1962. Dr. Cliff D. Carpenter, chairman, U.S. Participation Committee, 1207 Emerald Bay, Laguna Beach, Calif.; Dr. A. William Jasper, secretary, c/o AFBF, 2500 Merchandise Mart, Chicago 54, Ill.

The following courses will be offered by the Laboratory Branch, Communicable Disease Center, U. S. Public Health Service, Atlanta 22, Ga. Information and application forms may be obtained from the foregoing address.

**Schedule of Laboratory Refresher Training Courses
July 1961 — June 1962**

Dates	Courses	Duration
Sept. 11-Oct. 6	Laboratory Methods in Medical Parasitology Part 1. Intestinal Parasites (800) Closing date: July 31, 1961	4 wks.
Sept. 18-29	Fundamentals of Virology (819) Closing date: Aug. 7, 1961	2 wks.
Oct. 2-13	Fluorescent Antibody Techniques in <i>Streptococcus</i> Grouping (860) Closing date: Aug. 21, 1961	2 wks.

Dates	Courses	Duration
Oct. 9-27	Laboratory Methods in Medical Parasitology Part 2. Blood Parasites (801) Closing date: Aug. 28, 1961	3 wks.
Oct. 23-Nov. 3	Fluorescent Antibody Techniques in the Public Health Laboratory (845) Closing date: Sept. 11, 1961	2 wks.
Oct. 30-Nov. 17	Laboratory Methods in the Diagnosis of Viral and Rickettsial Diseases (820) Closing date: Sept. 18, 1961	3 wks.
Nov. 27-Dec. 1	Laboratory Methods in the Diagnosis of Rabies (826) Closing date: Oct. 16, 1961	1 wk.
Dec. 4-8	Bacteriophage Typing of Staphylococci (856) Closing date: Oct. 23, 1961	1 wk.
Jan. 8-Feb. 2	Laboratory Methods in Medical Mycology (815) Closing date: Nov. 27, 1961	4 wks.
Jan. 15-26	Laboratory Methods in the Diagnosis of Tuberculosis (855) Closing date: Dec. 4, 1961	2 wks.
Jan. 29-Feb. 9	Laboratory Methods in the Diagnosis of Tuberculosis (855) Closing date: Dec. 18, 1961	2 wks.
Jan. 29-Feb. 9	Serologic Methods in Microbiology (941) Closing date: Dec. 18, 1961	2 wks.
Feb. 12-23	Laboratory Methods in the Study of Pulmonary Mycoses (817) Closing date: Jan. 2, 1962	2 wks.
Feb. 12-23	Fundamentals of Virology (819) Closing date: Jan. 2, 1962	2 wks.
Feb. 26-March 16	Laboratory Methods in Medical Bacteriology (838) Closing date: Jan. 15, 1962	3 wks.
March 5-9	Laboratory Diagnostic Methods in Veterinary Mycology (940) Closing date: Jan. 22, 1962	1 wk.
March 12-30	Laboratory Methods in the Diagnosis of Viral and Rickettsial Diseases (820) Closing date: Jan. 29, 1962	3 wks.
March 19-23	Special Problems in Medical Bacteriology (839) Closing date: Feb. 5, 1962	1 wk.
March 26-April 6	Laboratory Methods in Enteric Bacteriology (850) Closing date: Feb. 12, 1962	2 wks.
April 9-13	Laboratory Methods in the Diagnosis of Rabies (826) Closing date: Feb. 26, 1962	1 wk.
Courses given by special arrangement only:		
	Laboratory Methods in the Diagnosis of Malaria (805)	1 wk.
	Special Training in Virus Techniques (821)	2-4 wks.
	Typing of <i>Corynebacterium diphtheriae</i> (842)	1 wk.
	Special Problems in Enteric Bacteriology (851)	2 wks.
	Phage Typing of <i>Salmonella typhosa</i> (852)	1 wk.
	Laboratory Methods in the Diagnosis of Leptospirosis (853)	1-4 wks.
	Serologic Differentiation of Streptococci (854)	2 wks.
	Special Problems in Microbiology (942)	1-2 wks.

Stomach Parasite of Cats Transmitted by Emesis

Upon examination of 50 stray cats in Sydney, Australia, 3 were found to harbor *Ollulanus tricuspis*, a 1-mm. long nematode parasite of the stomach. Infection is transmitted by emesis. The parasite has been found in a few European countries, but has not been reported in the United States.—*Austral. Vet. J.*, 36, (Aug., 1960): 352.



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All veterinarians must face the fact that **biologicals are not the same**. Products vary from manufacturer to manufacturer and serial to serial. There are, so to speak, "peaks and valleys" in the antibody or antigen content from serial to serial and product to product. Even though all biologicals are government regulated, there are products marketed for the prevention or treatment of the same disease that prove to have a wide variation in potency.

Unitage is the key to standardization. Once specific units are defined for measuring the content of veterinary biologicals it will enable manufacturers to eliminate the "valleys" (low potency) now evidenced from serial to serial. It is obvious that headway

on product improvement is going to be slow if we cannot measure accurately enough to detect these improvements. By determining the potency of a product, by measurement in units, we no longer depend on field results as the only means of analysis of the efficacy of a product.

Diamond researchers feel that veterinarians should be permitted to select a product on the basis of potency identified by stated units of the contents of the product. Only a few veterinary biologicals on the market today are identified by a potency statement on the label or insert. **Diamond now has more than 30 standardized biologicals approved by the ARS.** (see panel at right) The potency of these products is specified by a Diamond CERTIGARD Standard statement on either the label or package insert.

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METHODS OF STANDARDIZATION

Diamond Laboratories, in initiating its standardization program, has called on personnel from its Research, Control and Production departments for the purpose of setting the standards of Diamond biologicals.

VIRUS TITRATIONS in tissue culture systems, egg embryos and small animal inoculations are used in determining immunological potential of modified live virus vaccines.

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and the antibody response elicited by actual modified live virus vaccinations.

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Anti-Swine Erysipelas Serum

SEROGEN (concentrated Canine Distemper, Hepatitis, Leptospira Canicola Antibodies)

BLAC-LEG (Blackleg Bacterin)

BLAC-LEG-S (Blackleg Hemorrhagic Septicemia Bacterin)

BI-VAC (Clostridium Chauvei Septicum Bacterin)

POLY-VAC (Clostridium Chauvei Septicum Pasteurella Bacterin)

PERVAC-D (Clostridium Perfringens Type D)

B-VAC-A (Coli-Staphylococcus-Streptococcus Bacterin)

C-P-VAC (Corynebacterium Pasteurella Bacterin)

NEO-VAC (Erysipelas Bacterin)

HEMSEP-VAC (Hemorrhagic Septicemia Bacterin)

Leptospira Canicola-Icterohemorrhagiae Bacterin

NEO-LEP (Leptospira Pomona Bacterin)

B-VAC-1 (Mixed Bacterin (Bovine) Formula 1)

B-VAC-2 (Mixed Bacterin (Bovine) Formula 2)

B-VAC-3 (Mixed Bacterin (Bovine) Formula 3)

Mixed Bacterin (Canine) Formula 1

Mixed Bacterin (Equine) Formula 1

Mixed Bacterin (Feline)

OVAC-1 (Mixed Bacterin (Ovine) Formula 1)

PORVAC-1 (Mixed Bacterin (Porcine) Formula 1)

PORVAC-2 (Mixed Bacterin (Porcine) Formula 2)

Canine Distemper Vaccine (C.E.O.)

T.C.D. Canine Distemper Vaccine (T.C.O.)

Mink Distemper Vaccine

Feline Distemper Vaccine

I.B.R. (Infectious Bovine Rhinotracheitis Vaccine)

RHINO-LEP (Infectious Bovine Rhinotracheitis Vaccine and Leptospira Pomona Bacterin)

Rabies Vaccine (Caprine Origin)

Rabies Vaccine (C.E.O.)

HOG CHOLERA VACCINE — PORCINE & RABBIT ORIGIN

Public Relations

Professional Relations

An Open Letter to AVMA Members

Dear Doctor:

At this time of year we welcome the 1961 graduates into membership of this profession. We, as an association, extend to them our help, when we can be of help; our assistance, when problems of public information and professional relations confront them; and our best wishes for every success in the years ahead.

The existing pattern of veterinary medicine has been scrutinized by many of the leaders of our profession. They are predicting growth for all facets of the profession. Continued urbanization means growth for the new veterinarian who chooses small animal practice, and our exploding population means more meat and milk in areas concerning our large animal practitioners. Needs for veterinarians in research, teaching, laboratory animal care, and public health are creating more opportunities. Yes, the future looks good.

The new graduates have a well-rounded basic concept of veterinary medicine. The degree to which they use these fundamentals to develop skills now rests entirely with them. These skills are important to their success but are more important to the people they serve. Economics of an education have been paramount in their minds for several years. Are they ready to recognize that service to their clients is now their number one concern? During their student years, many decisions have been made for them. Now, they must make

the decisions that will affect the health of pets and livestock and the economic welfare of their clientele. Are you willing to give them counsel if you're asked?

They will have responsibilities to the communities in which they live. They should be called upon as professional men to render service to their churches, the service clubs, and to various civic projects. We urge them to participate because these too represent service to their clients and, more important, to their families. Will you help them get acquainted and will you encourage their participation?

With service to their clients and community goes a responsibility to our profession. Participation in organized veterinary medicine at a local, state, or national level should be a facet of their professional lives because it will enhance their personal development as well as the growth of the profession. A profession is strong because of its individual members and each member has a contribution to make at all levels of organized veterinary medicine. Won't you ask the newcomers to attend the meetings with you?

Even though they are just out of school, urge their participation in programs of continuing education, in veterinary short courses, and in conferences. These are the mediums through which you and they will maintain a high level of proficiency and learn of new advances.

Yes, 1961 is an important milestone for the new graduates. Their destiny rests mainly with them and depends largely upon the degree of moral responsibility they accept as they make their places in society. But you can help, Doctor, perhaps more than you think.

Sincerely,

J. R. Hay, D.V.M.

Director, Professional Relations

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Hog-Lard Raincoats Shown

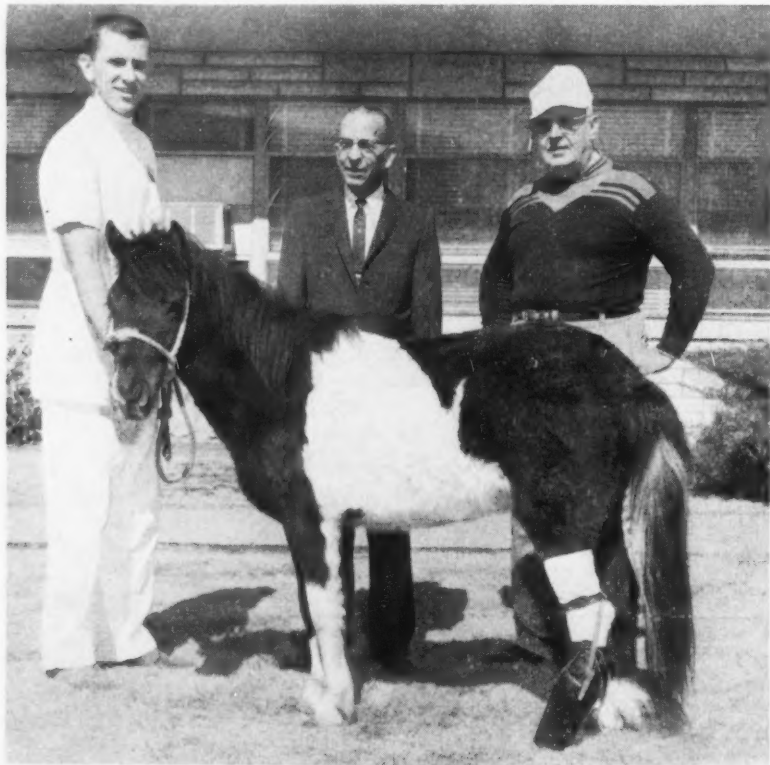
A raincoat made from hog's lard was modeled at Cornell University during the school's Agricultural Progress Days. The raincoat was designed by agricultural researchers, looking for ways to utilize the by-products of the hog industry.—*Cornell University Release—March, 1961.*

Beef Import Competition Grows

If importation of beef and veal continues through 1960 at the same rate as in the first 6 months, our acceptance of foreign beef and veal could total 509.5 million pounds this year. Total for the 12 months of 1958 was 356.6 million pounds.

Nearly all this beef is low grade, pickled, and boneless, used for processed meat. Percentage-wise to U.S. production, it represented 19 per cent in 1958 and 29 per cent in 1959. Prior to 1958, it was only 2 to 3 per cent of the U.S. cow-beef production.

Last year, we imported \$554 million in livestock and meat, more than double the 1951 to 1955 annual average and about \$200 million more than the United States exported in 1959.—*Aberdeen Angus, 42, (Dec., 1960): 40.*



When a black and white Shetland pony named Pete accidentally lost his left hind foot, Dr. F. W. Oehme (COR '58) of Kansas State University's veterinary hospital set out to provide a new one. With the aid of a Manhattan shoe repairman, Clyde S. Olson, and a K-State carpenter, H. F. Laue, a wooden leg was fashioned with boot and straps so that Pete once again could walk on all fours. Pictured with "Peg-Leg Pete" are his benefactors, Dr. Oehme, Mr. Olson, and Mr. Laue.

Dr. W. H. Beckenhauer Promoted at Norden

William H. Beckenhauer (KSU '51), formerly in charge of professional services and assistant to the director of biological production and research, has been promoted to director of the research and development division, Norden Laboratories, Inc. The new division will consolidate and expand the research and development activities formerly conducted separately by the biological and pharmaceutical divisions.

After receiving his B.S. and D.V.M. degrees, Dr. Beckenhauer practiced at Lin-

coln, Neb. In 1953 he joined the veterinary clinic staff at Colorado State University, where he continued his studies, receiving the M.S. degree in veterinary surgery.

Since joining Norden in 1956, Dr. Beckenhauer has been engaged in diagnosis,



Dr. William H. Beckenhauer

Crying Expresses Fear in Cattle

Crying as a reaction to fear, pain, or emotion is supposed to be a peculiarity of man. Crying in animals seems not to have been observed.

However, German workers observed that upon blood sampling of some cattle there was hypersecretion of the tear glands causing formation of tears ("crying"). In a test series, blood samples were collected from bulls at intervals of several days at an artificial insemination establishment. All bulls were given the same care and blood samples were always collected by the same veterinarians. Formation of tears occurred in 24 of 42 bulls. Tear formation might have been induced by a feeling of fear, at least in the case of 2 bulls, which were observed to be "crying" when they were led into the room where blood samples were to be collected.

In 23 of the 42 bulls, there was no alteration in behavior, especially no signs of alarm. Eleven of these 23 bulls formed tears. However, in 19 there were signs of excitement, such as lively defense gestures, urination, and defecation. Thirteen of these 19 bulls formed tears. In slightly excitable bulls, therefore, tear formation was more frequent than in calmer animals.

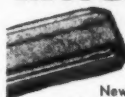
Tear formation was more often observed in older bulls: of 15 bulls, aged 7 to 10 years, 11 formed tears. Of 27 bulls, aged 2 to 6 years, 14 did.

Although the number of cattle observed was small, it might be that tear formation or "crying" as an expression of fear and perhaps of pain occurs in cattle.—*Berl. u. Münch. tierärztl. Wchnschr.*, 74, (March 15, 1961): 113.

consultation, and professional services. In this capacity, he has appeared as speaker at many meetings of regional and state veterinary medical associations. He was recently senior author of the article "Immunization of Swine Against Hog Cholera with a Bovine Enterovirus."

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98th Annual AVMA Meeting

August 20-24

Detroit, Michigan

SOUTH of the BORDER—to CANADA!

For hundreds of AVMA conventioners, the scientific and social sessions in Detroit (August 20-24) will be but a pleasant prelude or postlude to an even more enjoyable vacation. Primary target for many of these vacationers will be Canada, located on the south side of the Detroit River from the AVMA convention headquarters (Cobo Hall) in Detroit.

Those visiting Detroit will find the Dominion only minutes away and, whether the trip is made only to mail a postcard from neighboring Windsor or to take an extended fishing, hunting, or touring trip, visitors will find the Canadians friendly and eager to welcome them.

Crossing the United States-Canadian border from either direction is not difficult for citizens or permanent residents of the United States. No passports are required, however, tourists are advised to carry birth, baptismal, or voters' certificates for evidence of citizenship. Naturalized citizens should bring their naturalization pa-

pers for presentation to border officials. Aliens visiting the United States and wishing to extend their trips into Canada should consult with Canadian representatives in their countries to obtain valid travel visas, if required.

Those driving into Canada should take their vehicle registration cards. Drivers' licenses from any state or country are valid while vacationing in the Dominion.

You may make many duty- and tax-free purchases while visiting Canada. Visitors who stay more than 48 hours are allowed a \$200 exemption from duty on purchases made the first 31 days. An additional exemption of \$300 for each 6 months is allowed for visitors of more than 12 days' duration. Thus, if one stays 2 weeks, he may bring \$500 in goods back to the United States without paying duty. Under these exemptions is included the importation of either 1 gallon of alcoholic beverages or 100 cigars for those who stay more than 48 hours.

Recollet Falls on the French River, left, is just one of the many beautiful fishing waters of Canada. Due to Detroit's unique geographical position, it is one of the few spots in the United States where one can travel south—and end up in Canada.

Ontario Offers Varied Pleasures

Located across the Detroit River and visible to the south of Cobo Hall Exhibit Center is the Province of Ontario. With vast resources for vacation pleasure, Ontario fronts on 4 of the 5 Great Lakes, contains a quarter of a million more lakes, and is more than half again as large as Texas. The provincial capital, Toronto, is but 225 miles from AVMA convention headquarters. The bilingual city of Ottawa, capital of the Dominion, is also in Ontario.

Any attempt to enumerate all the vacation possibilities in Canada in this short space would be futile. Two of the more spectacular events which will take place in Ontario around convention time are:

The Stratford Shakespearean Festival at Stratford, Ont., from June 19 to September 23. This is one of the world's foremost artistic festivals featuring performances

year to view the world's largest annual fair. The products of the nation are displayed in a holiday atmosphere. The fair lasts from August 24 through September 10.

Besides these, of course, many other diversions are available. Canada is a sportsman's paradise, especially for those who wish to spend their vacations fishing, hunting, boating, or just relaxing in comfortable isolation.

Maps, tourist information, pamphlets, and brochures are available to all who request them from the following organizations:

Detroit Convention and Tourist Bureau
626 Book Building
Detroit 26, Mich.

The Ontario Department of Travel and Publicity
Parliament Building
Toronto 2, Ont.

Canadian Government Travel Bureau
Ottawa, Ont.

The government of Canada also maintains information centers at Canada



Above is the Stratford Shakespearean Festival Theatre in Ontario. The foyer is on the right and backstage on the left.

of the plays of Shakespeare. This year, concerts by renowned musical artists, performances of works by Gilbert and Sullivan, an international film festival, and an exhibit of the folk arts of Canada add to the cultural climate.

The Canadian National Exhibition at Toronto, where 3 million people go each

House, 680 Fifth Ave., New York 19, N. Y., and at 102 West Monroe St. in Chicago.

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(Fees must be submitted with registration form)

AVMA members and their guests	\$ 8.00 each
Wives of AVMA members	\$ 5.00 each
Children	\$ 3.00 each
Nonmembers and guests	\$15.00 each
Alumni Dinner Tickets	\$ 5.00 each

(Alumni Dinners will be held on Tuesday, August 22)

NOTE: Wives and children must be registered only if they will participate in women's, teens, or subteens' programs. Advance registration closes August 1, 1961. Refunds will be made only if request is received prior to August 7, 1961. Hotel reservations must be made by individual.

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August 20-24, Detroit, Michigan

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Complete Address _____

Wife's Name _____

Guest's Name (s) _____ Children's names and ages _____

Number of Alumni Dinner Tickets _____ School _____

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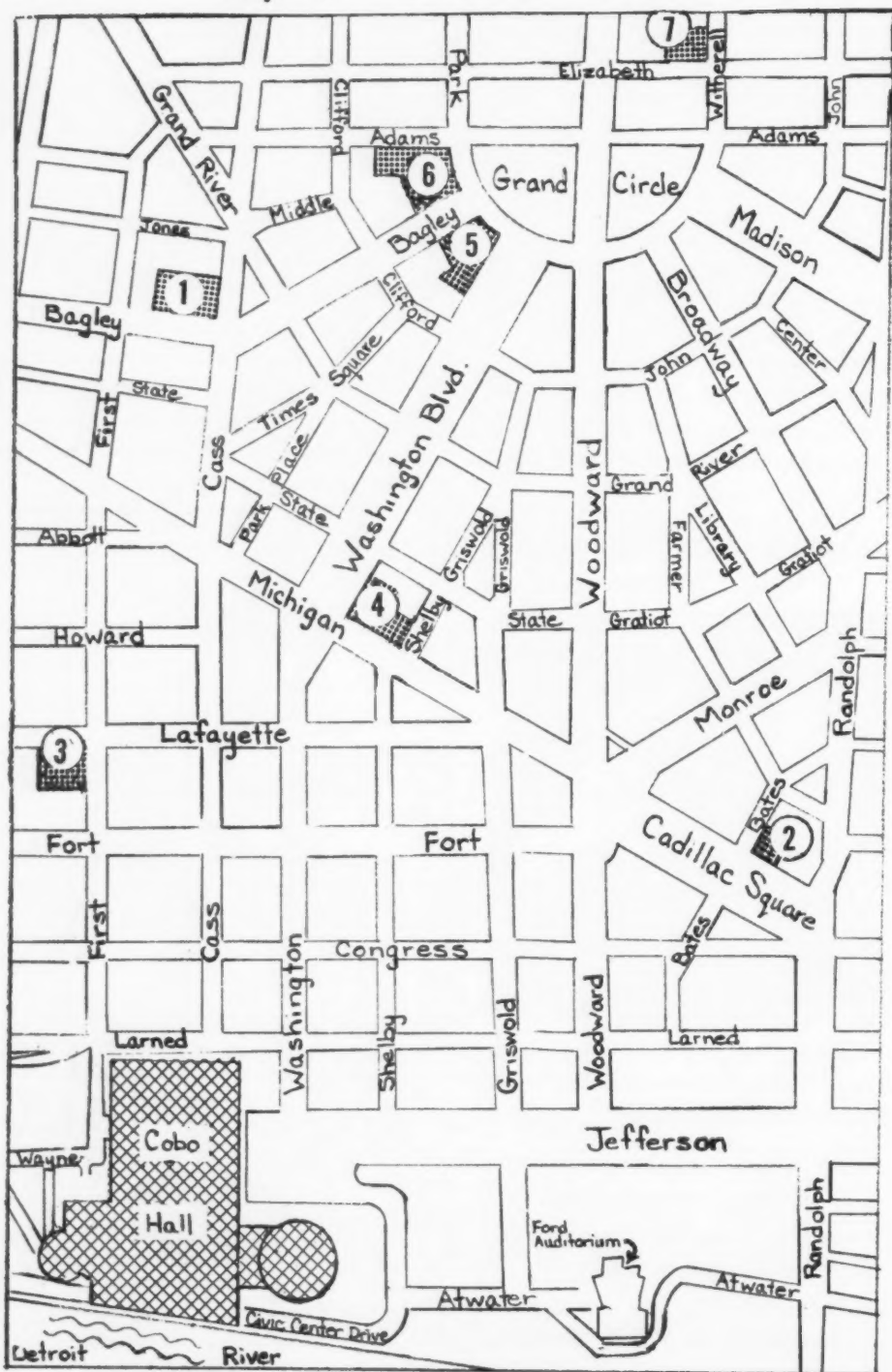
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Map of Downtown Detroit



ANNUAL MEETING HOTEL RESERVATION REQUEST

American Veterinary Medical Association

Detroit, Michigan - August 20-24, 1961

INSTRUCTIONS AND INFORMATION

Please give ALL of the information requested below and mail this form to the Detroit Convention and Tourist Bureau. All reservations must be cleared through the Housing Bureau.

Blocs of rooms have been allocated for our use in the hotels which are listed. The Housing Bureau must have the names of all the persons who will occupy each room. No bloc reservations will be made.

Placement will be made in the order received. Your choice of hotels will be followed if rooms are available. Otherwise, assignment will be made to best possible advantage elsewhere. You will receive a confirmation directly from the hotel. (NOTE: All rates are subject to change.) If you desire accommodations in a Detroit hotel not listed or a motel, please so indicate. The Housing Bureau will try to place you there.

FAMILY PLAN — The hotels listed offer a "family plan" whereby children under 14 years of age will be accommodated in the same room with their parents at no extra charge. If more than one room is required to accommodate children, the hotel will charge only the single rate for each additional room.

ANNUAL MEETING HOTELS

Hotel	Singles	For Two Persons		Suites	
		Doubles	Twins	1 Bedroom	2 Bedrooms
1 Detroit-Leland	\$7.50-13.50	\$10.50-16.00	\$12.00-19.00	\$25.00-35.00	\$38.50-50.50
2 Herrose	6.50-10.50	9.00-13.50	12.50-16.00	25.00	45.00
3 Pick-Fort Shelby	6.00-12.75	9.00-15.50	10.50-16.25	23.00-43.50	39.75-58.75
4 Sheraton-Cadillac (Headquarters Hotel)	8.50-18.00	14.35-20.50	14.85-23.00	29.00-37.50	46.00-56.00
5 Statler Hilton	7.00-13.50	12.50-17.00	14.00-24.50	38.00-44.00	59.50-97.00
6 Tuller	5.00- 9.00	9.00-12.00	10.50-15.00		
7 Wolverine	6.00- 9.00	8.50-10.00	11.00-18.50	25.00	35.00-45.00

APPLICATION FOR HOTEL ACCOMMODATIONS

MAIL TO: Housing Bureau, AVMA
Detroit Convention and Tourist Bureau
626 Book Building
Detroit 26, Michigan

CHOICES OF HOTELS: 1st CHOICE: HOTEL _____ 2nd CHOICE: HOTEL _____
3rd CHOICE: HOTEL _____ 4th CHOICE: HOTEL _____

ACCOMMODATIONS DESIRED:

RATE DESIRED:

_____ Room(s) with one bed for one person (Single) \$ _____ to \$ _____
_____ Room(s) with twin beds for two persons (Twin) \$ _____ to \$ _____
_____ Room(s) with one bed for two persons (Double) \$ _____ to \$ _____
_____ Suite(s) parlor and one bedroom \$ _____ to \$ _____
_____ Suite(s) parlor and two bedrooms \$ _____ to \$ _____

ARRIVAL TIME: Date _____ Hour _____ DEPARTURE TIME: Date _____ Hour _____

LIST NAMES OF ALL PERSONS WHO WILL OCCUPY EACH ROOM:

Name	Street Address	City and State

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Mating between coyotes and dogs, usually German Shepherd Dogs or Collies, has produced the "coydog," a husky hybrid which, like the coyote, will kill deer, small game, and fowl. According to Professor W. J. Hamilton, Jr., of Cornell University, the coydog can now be found in most states. It resembles the coyote in color and body build, but weighs up to 20 lb. more. Unlike some hybrids, it can reproduce.—*Dog World*, Feb., 1961.

Milk Production Increases But Number of Dairy Farms Drops

There has been a drop of 39% in the number of farms with milk cows between 1954 and 1959, and yet the number of milk cows decreased only 18%. Apparently there has been a sharp shift toward larger herds and fewer dairy farms during this 5-year period.

Most of the increase of 931,000,000 lb. in U.S. milk production from 1959 to 1960 occurred in the North Atlantic and western regions of the country. The 5 leading

states in 1960 milk production are Wisconsin, New York, Minnesota, California, and Pennsylvania.

Annual milk production per cow set a new record of 7,004 lb. in 1960, up 189 lb. from the previous high in 1959. Annual U.S. output per cow increased 3 to 4% each year since 1954.

The average number of milk cows on farms during 1960 was 17,549,000, a record low in the series of estimates beginning in 1924. Milk cow numbers have decreased each year since 1953, but the decline from 1959 to 1960 was only 2%, compared with 4 to 5% in each of the 3 preceding years.—*Milk Production USDA*, Feb. 13, 1961.

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Wisconsin Senate Passes Dog House Standards Bill

A dog's life is getting better all the time.

The Wisconsin state senate recently passed and sent to the Assembly a bill establishing minimum standards for all dog houses. The proposed bill would authorize a fine up to \$500, a year in jail, or both for dog owners who fail to provide their dogs with (1) moisture-proof and wind-proof houses made of a durable material and large enough to accommodate the dog, (2) a solid dog house floor raised 2 or more inches from the ground, (3) a sufficient quantity of suitable bedding or blankets, and (4) shade from direct rays of the sun from June to September.

The original bill also provided for a swinging door, but this feature was eliminated when it was found that some dogs refuse to use them.—*Wisconsin State J.*, April 14, 1961.

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PERSONAL WANT ADS—\$4.00 for the first 25 words and 10 cents for each additional word; 35 cents for use of box number.

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1st of month issue — 8th of month preceding date of issue.

15th of month issue — 22nd of month preceding date of issue.

Names of classified advertisers using key letters can not be supplied. Address your reply to the box number, c/o JOURNAL of the AVMA, 600 S. Michigan Ave., Chicago 5, Ill., and it will be sent to the advertiser.

Wanted—Veterinarians

Opening for experienced associate veterinarian in small animal hospital in western Connecticut. Must be good diagnostician, progressive, capable of handling large practice. Starting salary—\$12,000. Annual increments and bonuses. Address Box F 3, JOURNAL of the AVMA.

Wanted—veterinary assistant in predominately large animal practice in Iowa. Permanent position available with salary at start and partnership in future. Prefer young, married, recent graduate. Address Box F 4, JOURNAL of the AVMA.

Immediate opening for assistant in small animal practice in south suburban Chicago area. Address Box F 21, JOURNAL of the AVMA.

Wanted—veterinarian with 2 to 4 years' experience in poultry virus disease field. Advanced degrees and background in tissue culture systems are desirable. Will direct general tissue culture laboratory and supervise actual laboratory study of poultry vaccines. Chemo-therapeutic studies are included. Excellent opportunity for professional growth in expanding midwestern company. Salary range established is \$8,500 to \$12,000. Starting salary commensurate with experience. Submit detailed resume. Address Box F 6, JOURNAL of the AVMA.

Wanted—experienced associate for AAHA accredited small animal hospital in southern California. Top salary plus percentage leading to possible partnership. Address Box F 10, JOURNAL of the AVMA.

Wanted—licensed veterinarian for staff of completely-equipped, modern, AAHA small animal hospital in New York City suburb. Complete details in first letter. Address Box D 56, JOURNAL of the AVMA.

Wanted—experienced veterinarian with California license for dairy practice. Salary range—\$10,000 to \$12,000 annually. Working conditions excellent. Address Box F 12, JOURNAL of the AVMA.

Veterinarian wanted for staff of large, modern institutional hospital for small animals in New York City. Excellent experience and research potential for enthusiastic person. License required. Address Box E 62, JOURNAL of the AVMA.

Wanted—veterinarian with Virginia license as assistant for modern small animal practice. Salary commensurate with ability. Substantial future. Address Box F 14, JOURNAL of the AVMA.

Wanted—veterinarian to practice in a beef cattle and sheep county. Approximately 26,000 cows and 30,000 ewes. Small ranch would fit practice. Best hunting and fishing. For more information, address Frank Burstedt, Challis, Idaho.

Position available immediately for veterinarian in southern California small animal hospital. State if licensed in California. Address Box F 18, JOURNAL of the AVMA.

Wanted—Positions

Experienced veterinarian, age 39, foreign graduate, presently in own successful practice, desires partnership or group practice position in modern small animal hospital. Can do good quality surgery. Licensed in Michigan, Ohio, Texas, Delaware, and Washington, D.C. Address Box F 7, JOURNAL of the AVMA.

Graduate (OSU '50) with 10 years' experience operating small animal hospital, desires position with future in small animal hospital in Chicago area. Address Box F 1, JOURNAL of the AVMA.

Veterinarian with several years' experience in mixed practice and 7 years with USDA desires position as assistant to practitioner. Married, excellent health, licensed in Indiana and Iowa, has car. Send information including expectations, salary and living facilities. Address Box F 19, JOURNAL of the AVMA.

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Wanted—commercial research supervisory position in animal health, nutrition, agricultural and veterinary product research and development. Clinical research programming, commercial and academic experience. Veterinarian. Pharmaceutical and biologics. Address Box E 14, JOURNAL of the AVMA.

Position with future in small animal or mixed practice, or purchase same, desired by young married veterinarian. Licensed in Colorado, Wyoming, California and Kansas. Address Box E 69, JOURNAL of the AVMA.

Veterinarian, experienced in small animal practice, licensed in New York and New Jersey, is available for relief work in New Jersey and New York metropolitan area. Address Box C 9, JOURNAL of the AVMA.

Girl desires position in veterinary medical center or with veterinarian. One year's experience at University of Pennsylvania veterinary school's heart station. Interested in gaining experience in all phases of veterinary medicine. Any locality suitable. Address G. Martin, Box 476, Bridgeton, New Jersey.

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For sale—southeastern Ohio small animal hospital, completely equipped, modern in every respect. Excellent practice. AAHA approved. Selling for health reasons. Address Box F 5, JOURNAL of the AVMA.

For sale—Nebraska mixed practice. \$8,500. Half partnership, equipment, drugs and part equity in building. \$1,500 down. Net over half of gross—\$40,000. Accepting college position. Available immediately. Address Box F 8, JOURNAL of the AVMA.

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For sale—mixed practice in prosperous rural area of eastern New York State. Gross—\$23,000. Hospital and real estate. Substantial capital required. Address Box D 19, JOURNAL of the AVMA.

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For sale—large animal practice in Iowa county seat town, with large public hospital. Pavement 6 ways. Priced at real estate value. Address Box F 24, JOURNAL of the AVMA.

For sale—large animal practice in eastern Iowa county seat town with pavement 4 ways. Priced at real estate value. Address Box E 74, JOURNAL of the AVMA.

For sale or lease—mixed practice in prosperous rural area of eastern New York State. Gross—\$23,000. Hospital and real estate. Capital required. Address Box F 22, JOURNAL of the AVMA.

For sale or lease—modern veterinary clinic, 35 cages, living quarters. General practice in Kentucky Bluegrass area. Residence. Opportunity for progressive veterinarian. Liberal terms. Address Box F 23, JOURNAL of the AVMA.

For sale—large, attractive 5-year-old animal hospital in one of Cleveland, Ohio's most exclusive and fashionable newer suburbs. Strict community zoning assures excellent future potential for this practice. Very pleasant and executive-type clientele. Owner retiring. Details will be furnished party or parties interested in acquiring this choice practice. Address Box F 25, JOURNAL of the AVMA.

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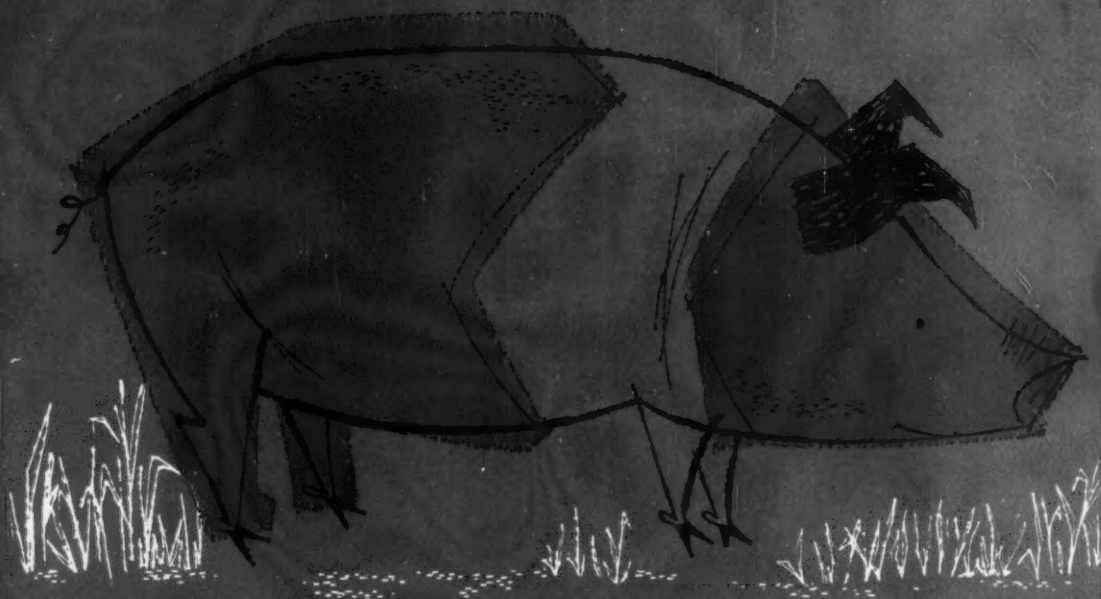
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When distemper virus is grown in the Jen-Sal canine kidney cell system and becomes **Cytogen** virus, its ability to invade the dog is also enhanced. Susceptible test animals successfully withstood challenge with virulent virus as early as four days after vaccination with **Cytogen**³.

3 Be sure of maximum stability:

Cytogen contains an exclusive stabilizing agent. With this stabilizer **Cytogen** virus has successfully protected dogs from virulent virus challenge after being artificially aged for a period equivalent to fourteen months of storage at room temperature⁴. For even greater superiority **Cytogen** is held well below freezing from the time it is produced until you receive it.

Cytogen is now available for immediate shipment from your Jen-Sal branch. Order now and "Be **Cytogen** Sure."

Package: 10 — 1 dose vials, with diluent

another new
and exclusive product
of



research!

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Clinical and Research References:

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